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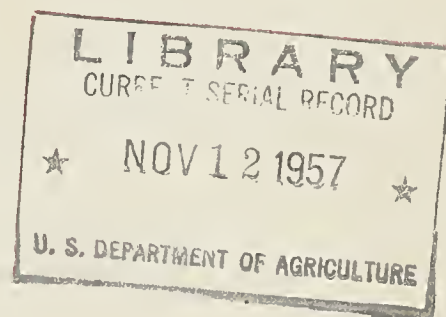
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Heights and Weights of
Children and Youth
in the United States

Home Economics Research Report No. 2

UNITED STATES DEPARTMENT OF AGRICULTURE

Heights and Weights of Children and Youth in the United States

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Contents

Heights and Weights of Children and Youth in the United States

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Purpose and Scope

This handbook has been prepared for reference use by research nutritionists and others interested in the growth and physical condition of children or concerned with long-range programs in education, nutrition, and health. Changes in height and weight have long been used as an index of growth and a criterion of nutriture, although many other measurements are also considered informative of physical well-being. Little overall analysis or interpretation has been made of the height-weight data collected over the years in this country, in part because the data are voluminous and widely scattered in the literature, and in part because of dissatisfaction with reference "standards" for general use in the various areas of the United States.

During the period represented in this compilation —chiefly from 1920 through 1956—changes have occurred in economic conditions, in food supplies, and in awareness of the nutritional and health needs of children. Large-scale measures have been initiated for improving the nutrient levels of diets through such programs as food enrichment, school lunch, and nutrition education. Furthermore, medical knowledge and public health services have been extended to include better control of many communicable diseases. Persons using this handbook should keep in mind that such influences have had their effect on children in different stages of growth and should guard against unwarranted generalizations as to the causes underlying trends in body size of American children.

These data have been collected by many professional groups — anthropologists, nutritionists, physicians, nurses, and military and educational leaders—using a variety of techniques and with varying degrees of precision, so that data from the different studies do not represent comparable population sampling. It seemed important, however, to bring together available information to give research workers a better background for planning further studies.

The compilation includes (1) general tables giving height-weight data from research studies on children and youth from 34 States and the District of Columbia; (2) height-weight standards used in appraisal of growth and nutritional status; (3) special tables relating height-weight-age data to some factors affecting growth patterns; and (4) an annotated list of references which furnishes pertinent details of methodology and supplementary information concerning the studies from which data have been quoted, and presents additional studies covering other measurements not discussed.

Data on height and weight measurements in this compilation are limited to those on white boys and girls from ages 2 through 18 years. Classification by home State and region, used in tables 1 through 34 in Section 1, is impossible for most data reported for persons above secondary school age. A second handbook is planned to cover data under the following classifications: College students, aged 16 through 21 years; armed service personnel of comparable ages; and adults, 20 years of age and older. Some overlapping among these age groups is unavoidable because of the nature of available data.

Section I.—Tables of Original Height-Weight Data

Data are presented in tables 1 - 17 for boys and tables 18 - 34 for girls, for each year of age from 2 through 18, by region and State in the order given in census reports (fig. 1) when possible. A few "general regional" data, given at the end of the tables, could not be so classified. Some publications contained only statements of plus or minus variations from selected standards, that is, no absolute values. Original data were frequently supplied by the investigators upon request. In these cases the original data are coded in the tables as not published (n. p.) and references to both the original data and the published reports are included in the annotated list of references. Unpublished data are credited to the research person chiefly responsible for their collection.

The following adaptations of the data for use in tables 1 - 34 have been necessary:

1. When the date on which measurements were begun was not reported, or age was not defined, it was estimated if possible, and the data enclosed in parentheses in the table.

2. When a number of children of a given age measured for height differed from the number measured for weight, the smaller number was cited in the table.

3. When averages for an age group were derived especially for these tables from original individual data giving ages in months, the age at the last birthday was used.

4. In general, only one unit each for height and weight was given in the original data. To make comparisons possible all data were calculated for both metric and English units. Averages for data as presented were rounded to one decimal, and conversions made from these rounded figures. Slight discrepancies between values for the corresponding units appear occasionally, depending upon whether metric or English units were reported originally.

Other adaptations necessary in order to include the data in this compilation are described in the annotated references.

At the end of each table two convenient "standards" arbitrarily chosen for comparison with the average values from the various studies are presented. See tables 1a through 34a. The Woodbury and Baldwin-Wood standards are considered representative of values for children in the 1920's, the Jackson-Kelly and Stuart-Meredith values of those for children in the 1930's and 40's. More detailed information on standards is given in Section II.
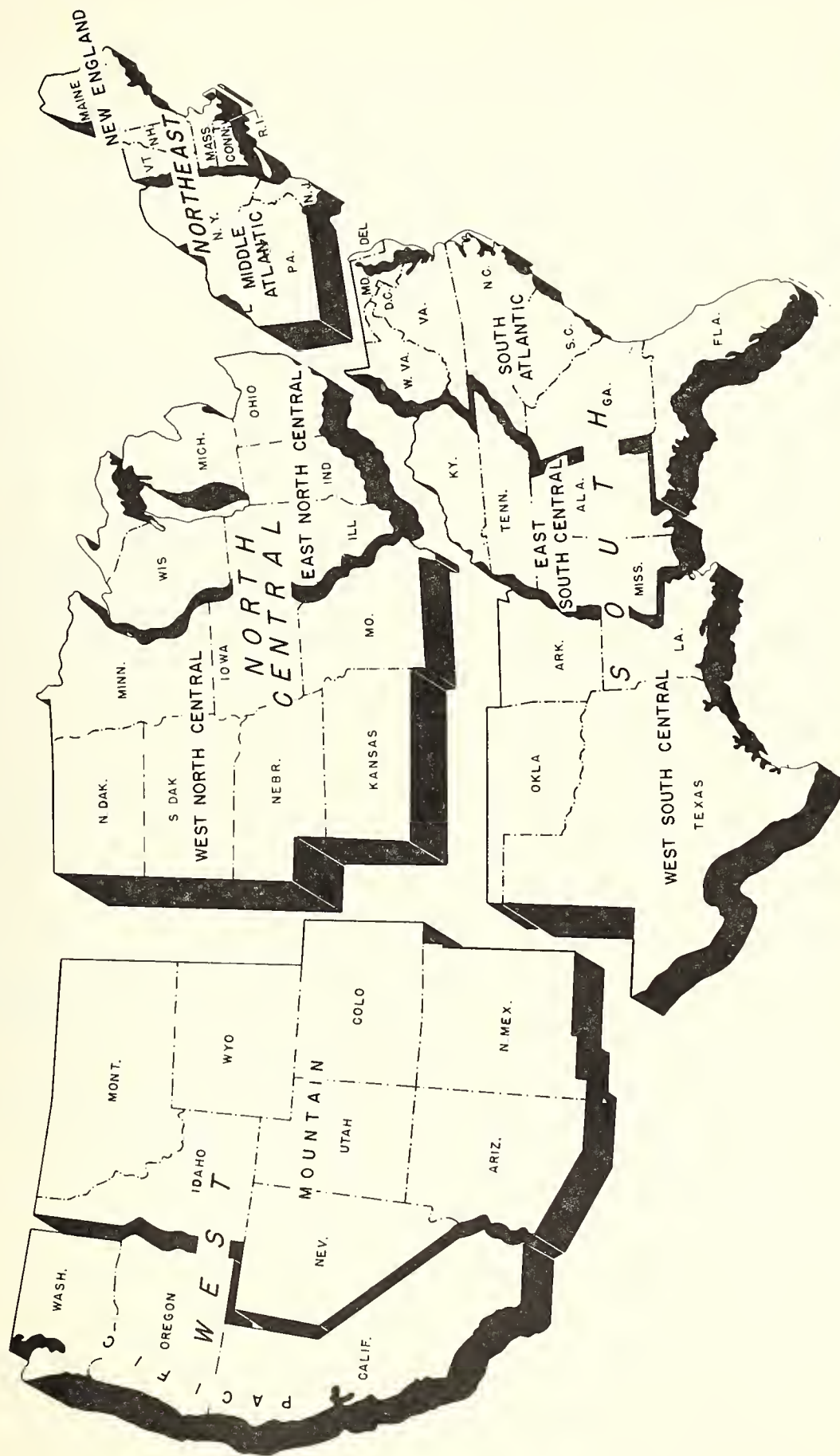
Figure 1.—Regions and geographic divisions of the United States.

TABLE 1.—TWO-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Massachusetts	(1930–42)	2±1/12	46	86.8	34.2	12.7	28.1	Vickers 1943
Connecticut-New York	(1930–37)	2±1/12	101	*88.1	*34.7	13.2	29.1	Peatman 1938
New York	1920–23	2 to 3	20	92.7	36.5	14.2	31.3	Johnson 1925
New York	1924–29	2±1/2	24	*89.9	*35.4	13.5	29.8	Wallis 1931
New York	1925–27	2±1/2	11	*91.1	*35.9	13.6	30.1	Sawtell 1929
New York	(<1933)	2±1/6	40	85.6	33.7	12.4	27.3	Freeman 1933
North Central:								
Ohio	1931–42	2.0	164	87.4	34.4	13.2	29.1	Simmons 1944
Illinois	(1930–39)	2 to 3	12	*93.4	*36.8	14.7	32.4	Blair 1940
Michigan	1922–29	2.0	29	87.9	34.6	13.0	28.7	Wilson 1930
Minnesota	(<1941)	2.0	12	*88.5	*34.8	12.8	28.2	Boyd 1941
Iowa	1920–34	2±1/2	432	88.1	34.7	13.1	28.9	Meredith 1935
Iowa	1923–27	2±1/2	52	86.1	33.9	12.3	27.2	Baldwin 1930
Southern:								
Virginia	1944–47	2±1/2	5	91.2	35.9	13.2	29.1	Dean 1955
Western:								
Colorado	1932–37	2 to 3	99	90.9	35.8	13.7	30.3	Maresh 1938
Colorado	1934–41	2 to 3	61	93.0	36.6	13.7	30.2	Duval 1942
California	1927–31	2.0	24	88.4	34.8	13.5	29.8	Bayley 1935
California	1931–47	2.0	66	88.3	34.8	13.6	30.0	Tuddenham 1954
General Regional:								
N. E., N. C., West	(1926–30)	2±1/2	21	89.6	35.3	13.4	29.5	Gray 1931

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 1a.—*Standards used for 2-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Woodbury-Grandprey	10th percentile	80.0	31.5	10.3	22.8	Grandprey 1933
	Average	85.4	33.6	12.1	26.7	Woodbury 1921
	90th percentile	90.4	35.6	13.7	30.2	Grandprey 1933
Jackson-Kelly (Meredith data)	Mean −1SD	82.8	33.6	---------	---------	Jackson 1945
	Mean	88.1	34.7	---------	---------	
	Mean +1SD	90.9	35.8	---------	---------	
	16th percentile	---------	---------	11.7	25.9	
	Median	---------	---------	13.0	28.6	
	84th percentile	---------	---------	14.5	31.9	

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TABLE 2.—THREE-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Massachusetts_____	(1930–42)	3±¹⁄₁₂	77	94.8	37.3	14.7	32.4	Vickers 1943
Connecticut-New York____	(1930–37)	3±¹⁄₁₂	93	*97.3	*38.3	15.3	33.8	Peatman 1938
New York_____	1920–23	3 to 4	22	100.3	39.5	16.4	36.1	Johnson 1925
New York_____	1924–29	3±½	23	96.2	37.9	15.1	33.3	Wallis 1931
New York_____	1925–27	3±½	16	*97.0	*38.2	14.6	32.2	Sawtell 1929
New York_____	(<1928)	3 to 4	47	91.7	36.1	13.1	28.9	Schwartz 1928
New York_____	(<1933)	3±⅙	60	96.0	37.8	14.9	32.8	Freeman 1933
New York_____	1940–55	3 to 4	7	100.6	39.6	16.8	36.9	Taylor n.p.
North Central:								
Ohio_____	1931–42	3.0	195	96.4	37.9	15.2	33.5	Simmons 1944
Illinois_____	(1930–39)	3 to 4	12	*100.2	*39.4	16.9	37.3	Blair 1940
Michigan_____	1922–29	3.0	56	95.5	37.6	14.9	32.9	Wilson 1930
Minnesota_____	(<1941)	3.0	31	*97.0	*38.2	15.0	33.1	Boyd 1941
Iowa_____	1920–34	3±½	533	96.2	37.9	15.2	33.5	Meredith 1935
Iowa_____	1923–27	3±½	34	93.5	36.4	14.0	30.9	Baldwin 1930
Southern:								
Virginia_____	1944–47	3±½	10	96.3	37.9	14.5	31.9	Dean 1955
Alabama_____	1942–52	3 to 4	44	101.3	39.9	16.8	37.1	Dreizen 1953
Texas_____	(1946–53)	3 to 4	15	102.7	40.4	16.5	36.4	Lamb 1954
Western:								
Colorado_____	1932–37	3 to 4	84	97.7	38.5	15.3	34.3	Maresh 1938
Colorado_____	1934–41	3 to 4	81	100.1	39.4	15.7	34.6	Duval 1942
California_____	1928–31	3.0	25	97.4	38.3	15.8	34.8	Bayley 1935
California_____	1931–47	3.0	66	96.7	38.1	15.7	34.6	Tuddenham 1954
General Regional:								
N. E., N. C., West_____	(1926–30)	3±½	28	96.8	38.1	15.3	33.7	Gray 1931

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 2a.—*Standards used for 3-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Woodbury-Grandprey_____	10th percentile_____	37.1	34.6	12.1	26.7	Grandprey 1933
	Average_____	93.2	36.7	14.0	30.9	Woodbury 1921
	90th percentile_____	98.6	38.8	16.0	35.2	Grandprey 1933
Jackson-Kelly (Meredith data)_____	Mean −1SD_____	93.0	36.6	--------	--------	
	Mean_____	96.0	37.8	--------	--------	
	Mean +1SD_____	100.0	39.5	--------	--------	Jackson 1945
	16th percentile_____	--------	--------	13.3	29.3	
	Median_____	--------	--------	15.1	33.2	
	84th percentile_____	--------	--------	16.8	37.0	

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TABLE 3.—FOUR-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Massachusetts	(1930–42)	$4\pm\frac{1}{12}$	85	102.5	40.4	16.6	36.6	Vickers 1943
Connecticut-New York	(1930–37)	$4\pm\frac{1}{12}$	63	104.4	41.1	17.3	38.1	Peatman 1938
New York	1920–23	4 to 5	23	107.4	42.3	18.7	41.2	Johnson 1925
New York	1924–29	$4\pm\frac{1}{2}$	38	101.5	40.0	16.6	36.7	Wallis 1931
New York	1925–27	$4\pm\frac{1}{2}$	21	*104.0	*40.9	16.8	37.0	Sawtell 1929
New York	(<1928)	4 to 5	58	101.6	40.0	16.2	35.7	Schwartz 1928
New York	(<1933)	$4\pm\frac{1}{6}$	36	102.7	40.4	16.9	37.3	Freeman 1933
New York	1940–55	4 to 5	5	105.5	41.5	18.7	41.1	Taylor n.p.
New York	1948–51	$4\pm\frac{1}{2}$	10	103.4	40.7	16.6	36.7	Young n.p.
North Central:								
Ohio	1931–42	4.0	215	104.0	40.9	17.4	38.4	Simmons 1944
Illinois	(1930–39)	4 to 5	12	*108.2	*42.6	20.3	44.8	Blair 1940
Michigan	1922–29	4.0	74	102.6	40.4	16.8	37.1	Wilson 1930
Minnesota	(<1941)	4.0	36	*104.4	*41.1	17.0	37.5	Boyd 1941
Iowa	1920–24	$4\pm\frac{1}{2}$	610	103.3	40.7	17.1	37.7	Meredith 1935
Iowa	1923–27	$4\pm\frac{1}{2}$	36	97.9	38.5	16.3	36.0	Baldwin 1930
Southern:								
Virginia	1944–47	$4\pm\frac{1}{2}$	13	101.9	40.1	16.5	36.3	Dean 1955
Alabama	1942–52	4 to 5	67	106.9	42.1	19.0	41.9	Dreizen 1953
Texas	(1946–53)	4 to 5	17	109.0	42.9	18.0	39.7	Lamb 1954
Western:								
Colorado	1932–37	4 to 5	53	108.1	42.6	18.0	39.6	Maresh 1938
Colorado	1934–41	4 to 5	89	107.7	42.4	17.7	30.0	Duval 1942
California	1931–47	4.0	66	104.3	41.1	17.8	39.2	Tuddenham 1954
General Regional:								
N. E., N. C., West	(1926–30)	$4\pm\frac{1}{2}$	34	104.7	41.2	17.3	38.1	Gray 1931
U. S. (16 States and D. C.)	1937–39	4 to 5	838	104.1	41.0	17.5	38.6	O'Brien 1941

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 3a.—*Standards used for 4-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Woodbury-Grandprey	10th percentile	93.7	36.9	13.5	29.8	Grandprey 1933
	50th percentile	99.7	39.2	15.6	34.4	Woodbury 1921
	90th percentile	105.2	41.4	17.9	39.4	Grandprey 1933
Jackson-Kelly (Meredith data)	Mean −1SD	99.7	39.2			⎫
	Mean	103.3	40.7			⎪
	Mean +1SD	107.2	42.2			⎬ Jackson 1945
	16th percentile			14.9	32.9	⎪
	Median			17.1	37.8	⎪
	84th percentile			19.1	42.0	⎭

TABLE 4.—FIVE-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	5±½	27	108.7	42.8	18.1	39.8	Clayton 1940
Maine	1936–40	5±½	27	110.2	43.4	18.6	41.1	Clayton 1944
Massachuetts	1922–34	5.5±¼	36	108.4	42.7	18.6	41.0	Shuttleworth 1939
Massachusetts	(1930–42)	5±¹⁄₁₂	87	108.9	42.9	18.6	40.9	Vickers 1943
Connecticut-New York	(1930–37)	5±¹⁄₁₂	67	110.5	43.5	18.8	41.4	Peatman 1938
New York	1920–23	5 to 6	28	114.0	44.9	20.8	45.8	Johnson 1925
New York	1924–29	5±½	51	110.4	43.5	19.0	41.9	Wallis 1931
New York	1925–27	5±½	22	*110.9	*43.7	18.8	41.4	Sawtell 1929
New York	(<1928)	5 to 6	65	109.0	42.9	18.1	40.0	Schwartz 1928
New York	(<1933)	5±⅙	34	111.9	44.1	19.6	43.2	Freeman 1933
New York	1948–51	5±½	24	109.5	43.1	19.9	43.9	Young n.p.
North Central:								
Ohio	1931–42	5.0	225	110.7	43.6	19.4	42.8	Simmons 1944
Illinois	(1930–39)	5 to 6	10	*112.1	*44.1	21.2	46.7	Blair 1940
Michigan	1922–29	5.0	41	109.0	42.9	18.5	40.8	Wilson 1930
Michigan	1954	5±½	12	113.5	44.7	21.5	47.3	Martin 1955
Minnesota	1932–33	5(±½)	112	114.3	45.0	19.3	42.5	Weisman 1935
Minnesota	(<1941)	5.0	29	*110.7	*43.6	18.8	41.4	Boyd 1941
Iowa	1920–27	5±½	96	109.8	43.2	18.9	41.7	Meredith 1941a
Iowa	1920–34	5±½	794	110.1	43.3	19.0	41.9	Meredith 1935
Iowa	1923–27	5±½	42	107.4	42.3	18.2	40.2	Baldwin 1930
Iowa	1930–37	5±½	165	110.7	43.6	19.2	42.3	Meredith 1941a
Southern:								
Virginia	1944–47	5±½	16	108.7	42.8	18.3	40.3	Dean 1955
Alabama	1942–52	5 to 6	75	114.3	45.0	21.1	46.5	Dreizen 1953
Texas	(1946–53)	5 to 6	10	113.5	44.7	19.8	43.7	Lamb 1954
Western:								
Wyoming	1929–34	5±½	14	109.5	43.1	18.2	40.2	Follstad 1938
Colorado	1932–37	5 to 6	22	112.3	44.2	19.6	43.3	Maresh 1938
Colorado	1934–41	5 to 6	103	114.5	45.1	19.8	43.7	Duval 1942
Utah	1950–51	5 to 6	5	109.5	43.1	18.5	40.8	Wilcox n.p. (a)
California	1931–47	5.0	66	111.1	43.7	20.1	44.3	Tuddenham 1954
General Regional:								
N. E., N. C., West	(1926–30)	5±½	74	111.2	43.8	19.6	43.2	Gray 1931
U. S. (16 States and D. C.)	1937–39	5 to 6	2,169	111.9	44.1	19.6	43.2	O'Brien 1941

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 4a.—*Standards used for 5-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Woodbury-Grandprey	10th percentile	99.6	39.2	14.9	32.8	Grandprey 1933
	Average	105.6	41.6	17.2	37.9	Woodbury 1921
	90th percentile	112.0	44.1	19.8	43.6	Grandprey 1933
Stuart-Meredith	10th percentile	105.3	41.5	16.6	36.6	
	25th percentile	108.3	42.6	18.0	39.6	
	50th percentile	111.3	43.8	19.4	42.8	Stuart 1946b
	75th percentile	114.2	45.0	21.1	46.5	
	90th percentile	116.7	45.9	22.5	49.7	

Table 5.—Six-year-old boys: *Heights and weights by region, State, and date of study*

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	Number	Centi- meters	Inches	Kilo- grams	Pounds	
Northeast:								
Maine	1934–36	6±½	88	115.8	45.6	20.9	46.0	Clayton 1940
Maine	1936–40	6±½	93	115.8	45.6	20.8	45.9	Clayton 1944
Massachusetts	1922–34	6±¼	162	111.5	43.9	19.8	43.6	Shuttleworth 1939
Massachusetts	(1930–42)	6±¹⁄₁₂	76	115.6	45.5	20.6	45.4	Vickers 1943
Massachusetts	1935–40	6±½	6	117.9	46.4	22.8	50.3	Miller 1943
New York	1920–23	6 to 7	38	117.6	46.3	22.0	48.5	Johnson 1925
New York	1924–29	6±½	35	114.9	54.2	20.3	44.8	Wallis 1931
New York	1925–27	6±½	20	*116.7	*45.9	20.5	45.2	Sawtell 1929
New York	(<1928)	6 to 7	102	115.3	45.4	20.1	44.4	Schwartz 1928
New York	(<1933)	6±⅙	36	117.2	46.1	22.1	48.7	Freeman 1933
New York	1948–51	6±½	14	115.6	45.5	21.6	47.7	Young n.p.
Pennsylvania	1925–27	6 to 7	1,006	115.1	45.3	21.1	46.6	Hundley 1955
Pennsylvania	1932–34	6 to 7	817	115.3	45.4	21.4	47.2	Hundley 1955
Pennsylvania	1937–39	6 to 7	253	117.3	46.2	21.6	47.5	O'Brien 1941
Pennsylvania	1947–49	6 to 7	1,133	117.1	46.1	22.0	48.4	Hundley 1955
North Central:								
Ohio	1931–42	6.0	222	117.7	46.3	21.9	48.2	Simmons 1944
Ohio	1937–39	6 to 7	294	117.5	46.3	21.5	47.3	O'Brien 1941
Illinois	(1923–37)	6(±½)	51	113.8	44.8	20.1	44.3	Hardy 1938
Illinois	(1930–36)	6.0	52	118.4	46.6	21.6	47.6	Richey 1937
Illinois	(1930–39)	6 to 7	8	119.8	47.2	24.5	54.0	Blair 1940
Illinois	1937–39	6 to 7	165	119.8	47.2	22.8	50.3	O'Brien 1941
Michigan	(<1936)	6±½	144	117.3	46.2	20.5	45.3	Steggerda 1936
Michigan	1937–39	6 to 7	176	117.8	46.4	22.1	48.7	O'Brien 1941
Michigan	1954	6±½	114	115.3	45.4	21.6	47.7	Martin 1955
Minnesota	1932–33	6(±½)	194	119.6	47.1	21.7	47.9	Weisman 1935
Minnesota	1937–39	6 to 7	563	117.4	46.2	21.5	47.4	O'Brien 1941
Minnesota	1938–39	6±½	92	114.2	45.0	20.9	46.1	Matheny 1947
Minnesota	(<1941)	6.0	13	*116.8	*46.0	20.6	45.4	Boyd 1941
Iowa	1920–27	6±½	108	115.8	45.6	21.0	46.3	Meredith 1941a
Iowa	1920–34	6±½	748	115.7	45.6	20.9	46.1	Meredith 1935
Iowa	1923–27	6±½	61	112.8	44.4	20.7	45.7	Baldwin 1930
Iowa	1930–37	6±½	148	117.4	46.2	21.7	47.8	Meredith 1941a
Iowa	1937–39	6 to 7	417	116.8	46.0	21.4	47.2	O'Brien 1941
Iowa	1948–51	6 to 7	36	117.7	46.3	22.8	50.3	Eppright 1954
Nebraska	1937–39	6 to 7	203	118.5	46.7	21.6	47.7	O'Brien 1941
Kansas	1937–39	6 to 7	220	117.5	46.3	21.5	47.4	O'Brien 1941
Southern:								
Maryland	1937–40	6 to 7	557	117.2	46.1	21.6	47.7	Wolff 1941, 1942
Maryland	1947	6(±½)	44	117.6	46.3	22.0	48.5	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	6 to 7	430	118.4	46.6	22.0	48.6	O'Brien 1941
Virginia	1944–47	6±½	18	115.8	45.6	21.0	46.3	Dean 1955
South Carolina	1940–42	6±½	49	112.9	44.4	19.9	43.9	Moser 1945
Tennessee	1932	6(±½)	28	116.8	46.0	22.3	49.2	Wheeler 1933
Tennessee	1937–39	6 to 7	162	116.4	45.8	20.7	45.6	O'Brien 1941
Alabama	1937–39	6 to 7	283	117.2	46.1	21.3	46.9	O'Brien 1941
Alabama	1942–52	6 to 7	146	119.1	46.9	22.6	49.9	Dreizen 1953
Alabama	1947	6(±½)	53	116.6	45.9	20.6	45.4	Martin 1948
Texas	1937–39	6 to 7	330	118.5	46.7	22.0	48.6	O'Brien 1941
Western:								
Wyoming	1929–34	6±½	37	114.8	45.2	20.0	44.2	Follstad 1938
Colorado	1934–41	6 to 7	106	121.6	47.9	22.6	49.8	Duval 1942
Colorado	1937–39	6 to 7	263	117.4	46.2	21.0	46.2	O'Brien 1941
Utah	(1931–35)	6±½	714	116.1	45.7	21.0	46.4	Brown 1936
Utah	1937–39	6 to 7	161	118.6	46.7	21.7	47.9	O'Brien 1941
Utah	1950–51	6 to 7	5	119.1	46.9	21.8	48.0	Wilcox n.p. (a)
Utah	1954–55	6 to 7	10	119.4	47.0	22.4	49.4	Wilcox n.p. (b)
California	1931–47	6.0	66	117.5	46.3	22.2	48.9	Tuddenham 1954
California	1936–38	6±½	3,628	116.8	46.0	21.7	47.9	Lloyd-Jones 1940, 1941
California	1937–39	6 to 7	237	119.1	46.9	22.7	50.1	O'Brien 1941

See footnotes at end of table.

8

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
General Regional:								
Northeast	1922–24	6±½	323	115.3	45.4	21.2	46.8	} Palmer 1935
North Central	1922–24	6±½	367	114.6	45.1	20.7	45.6	
South (Central)	1922–24	6±½	193	114.3	45.0	20.3	44.8	
West (Mountain)	1922–24	6±½	39	115.1	45.3	20.7	45.7	
N. E., N. C., West	(1926–30)	6±½	114	118.6	46.7	22.2	48.9	Gray 1931
U. S. (16 States and D. C.)	1937–39	6 to 7	4,157	117.8	46.4	21.7	47.8	O'Brien 1941

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 5a.—*Standards used for 6-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	109	43	18.6	41	} Baldwin 1923
	Medium	117	46	21.8	48	
	Tall	124	49	24.9	55	
Stuart-Meredith	10th percentile	111.2	43.8	18.6	40.9	} Stuart 1946b
	25th percentile	114.1	44.9	20.1	44.4	
	50th percentile	117.5	46.3	21.9	48.3	
	75th percentile	120.8	47.6	23.6	52.1	
	90th percentile	123.5	48.6	25.6	56.4	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	7 ± ½	62	120.6	47.5	23.0	50.6	Clayton 1940
Maine	1936–40	7 ± ½	87	121.9	48.0	23.3	51.4	Clayton 1944
Massachusetts	1922–34	7 ± ¼	473	117.6	46.3	22.2	49.0	Shuttleworth 1939
Massachusetts	(1930–42)	7 ± 1/12	63	121.5	47.8	23.3	51.2	Vickers 1943
Massachusetts	1935–40	7 ± ½	13	124.6	49.1	25.5	56.2	Miller 1943
Connecticut	1934–36	7 to 7½	365	120.6	47.5	23.9	52.7	Jenss 1940
New York	1920–23	7 to 8	36	121.9	48.0	23.6	52.0	Johnson 1925
New York	1924–29	7 ± ½	23	123.7	48.7	23.6	52.1	Wallis 1931
New York	1925–27	7 ± ½	11	124.6	49.1	23.7	52.2	Sawtell 1929
New York	(<1928)	7 to 8	118	123.7	48.7	23.2	51.1	Schwartz 1928
New York	(<1933)	7 ± 1/6	54	124.3	48.9	24.3	53.6	Freeman 1933
New York	1940–55	7 to 8	5	121.0	47.6	24.0	52.8	Taylor n.p.
New York	1948–51	7 ± ½	16	123.2	48.5	24.3	53.5	Young n.p.
Pennsylvania	1937–39	7 to 8	290	122.5	48.2	23.7	52.3	O'Brien 1941
North Central:								
Ohio	1931–42	7.0	219	123.8	48.7	24.6	54.2	Simmons 1944
Ohio	1937–39	7 to 8	392	122.9	48.4	23.7	52.2	O'Brien 1941
Illinois	(1923–37)	7(± ½)	103	119.1	46.9	21.5	47.4	Hardy 1938
Illinois	(1930–36)	7.0	73	124.0	48.8	24.0	53.0	Richey 1937
Illinois	1937–39	7 to 8	270	125.3	49.3	24.9	55.0	O'Brien 1941
Michigan	(<1936)	7 ± ½	220	123.4	48.6	23.0	50.6	Steggerda 1936
Michigan	1937–39	7 to 8	248	123.2	48.6	24.2	53.4	O'Brien 1941
Michigan	1954	7 ± ½	102	122.4	48.2	25.3	55.7	Martin 1955
Minnesota	1932–33	7(± ½)	293	123.7	48.7	23.2	52.5	Weisman 1935
Minnesota	1937–39	7 to 8	559	122.8	48.3	23.9	52.6	O'Brien 1941
Minnesota	1938–39	7 ± ½	133	120.5	47.4	23.2	51.1	Matheny 1947
Iowa	1920–27	7 ± ½	112	121.8	48.0	23.3	51.4	Meredith 1941a
Iowa	1920–34	7 ± ½	575	121.9	48.0	23.5	51.8	Meredith 1935
Iowa	1923–27	7 ± ½	67	119.4	47.0	22.9	50.4	Baldwin 1930
Iowa	1930–37	7 ± ½	130	123.3	48.5	24.4	53.8	Meredith 1941a
Iowa	1937–39	7 to 8	429	122.5	48.2	23.6	52.0	O'Brien 1941
Iowa	1948–51	7 to 8	57	124.1	48.9	25.0	55.1	Eppright 1954
Nebraska	1937–39	7 to 8	221	124.0	48.8	24.1	53.1	O'Brien 1941
Kansas	1937–39	7 to 8	320	122.9	48.4	23.6	52.0	O'Brien 1941
Southern:								
Maryland	1937–40	7 to 8	889	121.6	47.9	23.6	52.0	Wolff 1941, 1942
Maryland	1947	7(± ½)	55	121.2	47.7	24.0	52.8	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	7 to 8	502	123.5	48.6	24.2	53.4	O'Brien 1941
Virginia	1918–30	7 ± ½	14	118.5	46.7			Bean 1931
Virginia	1944–47	7 ± ½	15	120.9	47.6	22.5	49.7	Dean 1955
South Carolina	1940–42	7 ± ½	61	119.0	46.9	22.6	49.8	Moser 1945
Tennessee	1932	7(± ½)	65	119.4	47.0	23.4	51.6	Wheeler 1933
Tennessee	1937–39	7 to 8	220	122.6	48.3	23.4	51.5	O'Brien 1941
Alabama	1937–39	7 to 8	436	122.8	48.3	23.3	51.4	O'Brien 1941
Alabama	1942–52	7 to 8	127	124.7	49.1	25.6	56.5	Dreizen 1953
Alabama	1947	7(± ½)	67	121.9	48.0	22.7	50.0	Martin 1948
Texas	1929–31	• 7 ± ½	109	121.7	47.9	23.3	51.4	Whitacre 1939
Texas	1937–39	7 to 8	434	123.8	48.7	24.3	53.6	O'Brien 1941
Western:								
Wyoming	1929–34	7 ± ½	57	120.3	47.4	22.4	49.3	Follstad 1938
Colorado	1934–41	7 to 8	93	127.6	50.2	25.4	56.0	Duval 1942
Colorado	1937–39	7 to 8	298	122.2	48.1	22.7	50.1	O'Brien 1941
Utah	(1931–35)	7 ± ½	1,436	120.6	47.5	22.8	50.3	Brown 1936
Utah	1937–39	7 to 8	245	124.1	48.8	23.7	52.3	O'Brien 1941
Utah	1950–51	7 to 8	7	124.2	48.9	22.8	50.3	Wilcox n.p. (a)
Utah	1954–55	7 to 8	103	123.7	48.7	24.4	53.8	Wilcox n.p. (b)
Oregon	1950	7 ± 1/6	260	122.2	48.1	23.9	52.7	Meredith 1953
California	1923	7.0	10	123.2	48.5	24.4	53.9	Baldwin 1925b
California	1931–47	7.0	66	124.0	48.8	24.7	54.5	Tuddenham 1954
California	1936–38	7 ± ½	4,151	122.4	48.2	24.0	53.0	Lloyd-Jones 1940, 1941
California	1937–39	7 to 8	234	125.0	49.2	25.1	55.4	O'Brien 1941

See footnote at end of table.

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi-meters	Inches	Kilo-grams	Pounds	
General Regional:								
Northeast	1922–24	$7 \pm \frac{1}{2}$	527	119.6	47.1	23.0	50.6	⎫
North Central	1922–24	$7 \pm \frac{1}{2}$	492	119.9	47.2	22.7	50.0	⎬ Palmer 1935
South (Central)	1922–24	$7 \pm \frac{1}{2}$	440	118.9	46.8	22.2	49.0	⎪
West (Mountain)	1922–24	$7 \pm \frac{1}{2}$	141	118.6	46.7	21.9	48.3	⎭
N. E., N. C., West	(1926–30)	$7 \pm \frac{1}{2}$	143	124.7	49.1	24.6	54.2	Gray 1931
U. S. (16 States and D. C.)	1937–39	7 to 8	5,098	123.3	48.5	23.9	52.6	O'Brien 1941

[1] Dates in parentheses are estimated.

Table 6a.—*Standards used for 7-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	Inches	Kilo-grams	Pounds	
Baldwin-Wood	Short	114	45	20.9	46	⎫
	Medium	122	48	24.0	53	⎬ Baldwin 1923
	Tall	130	51	27.7	61	⎭
Stuart-Meredith	10th percentile	116.9	46.0	20.8	45.8	⎫
	25th percentile	120.3	47.4	22.5	49.7	⎪
	50th percentile	124.1	48.9	24.5	54.1	⎬ Stuart 1946b
	75th percentile	127.6	50.2	26.6	58.7	⎪
	90th percentile	130.5	51.4	29.2	64.4	⎭

TABLE 7.—EIGHT-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	8±½	96	126.0	49.6	25.7	56.7	Clayton 1940
Maine	1936–40	8±½	94	127.0	50.0	25.4	56.0	Clayton 1944
Massachusetts	1922–34	8±¼	590	123.3	48.5	24.8	54.8	Shuttleworth 1939
Massachusetts	(1930–42)	8±¹⁄₁₂	56	127.4	50.2	25.3	55.8	Vickers 1943
Massachusetts	1935–40	8±½	14	130.3	51.3	29.3	64.6	Miller 1943
New York	1920–23	8 to 9	25	125.5	49.4	24.5	54.1	Johnson 1925
New York	1924–29	8±½	18	128.6	50.6	26.0	57.3	Wallis 1931
New York	1925–27	8±½	9	128.0	50.4	25.2	55.6	Sawtell 1929
New York	(<1928)	8 to 9	95	128.5	50.6	25.4	55.9	Schwartz 1928
New York	(<1933)	8±¹⁄₆	30	127.3	50.1	25.7	56.7	Freeman 1933
New York	1940–55	8 to 9	8	133.3	52.5	31.2	68.7	Taylor n.p.
New York	1948–51	8±½	14	129.0	50.8	26.9	59.2	Young n.p.
Pennsylvania	1937–39	8 to 9	299	127.7	50.3	26.4	58.3	O'Brien 1941
North Central:								
Ohio	1931–42	8.0	207	129.9	51.1	27.9	61.6	Simmons 1944
Ohio	1937–39	8 to 9	488	128.0	50.4	25.9	57.0	O'Brien 1941
Illinois	(1923–37)	8(±½)	137	124.2	48.9	23.9	52.7	Hardy 1938
Illinois	(1930–36)	8.0	96	129.3	50.9	26.3	58.0	Richey 1937
Illinois	1937–39	8 to 9	348	129.5	51.0	27.2	60.0	O'Brien 1941
Michigan	(<1936)	8±½	232	129.0	50.8	25.0	55.2	Steggerda 1936
Michigan	1937–39	8 to 9	345	128.6	50.6	26.9	59.4	O'Brien 1941
Michigan	1954	8±½	108	127.5	50.2	28.3	62.3	Martin 1955
Minnesota	1932–33	8(±½)	258	130.6	51.4	26.9	59.2	Weisman 1935
Minnesota	1937–39	8 to 9	577	128.8	50.7	26.7	58.8	O'Brien 1941
Minnesota	1938–39	8±½	143	126.3	49.7	25.4	56.0	Matheny 1947
Iowa	1920–27	8±½	116	127.9	50.4	26.0	57.3	Meredith 1941a
Iowa	1920–34	8±½	493	128.1	50.4	26.3	58.0	Meredith 1935
Iowa	1923–27	8±½	42	125.1	49.3	25.5	56.3	Baldwin 1930
Iowa	1930–37	8±½	114	130.1	51.2	27.7	61.1	Meredith 1941a
Iowa	1937–39	8 to 9	544	128.4	50.6	26.6	58.6	O'Brien 1941
Iowa	1948–51	8 to 9	53	131.0	51.6	28.6	63.1	Eppright 1954
Nebraska	1937–39	8 to 9	225	129.1	50.8	26.4	58.1	O'Brien 1941
Kansas	1937–39	8 to 9	346	129.4	50.9	26.8	59.0	O'Brien 1941
Southern:								
Maryland	1937–40	8 to 9	939	126.9	50.0	26.0	57.4	Wolff 1941, 1942
Maryland	1947	8(±½)	81	127.5	50.2	26.2	57.7	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	8 to 9	535	129.2	50.9	26.9	59.4	O'Brien 1941
Virginia	1918–30	8±½	17	124.5	49.0	--------	--------	Bean 1931
Virginia	1944–47	8±½	10	125.7	49.5	24.5	54.0	Dean 1955
Virginia	1951–52	8±½	19	130.3	51.3	30.9	68.1	Dean n.p.
South Carolina	1940–42	8±½	56	126.6	49.8	25.9	57.2	Moser 1945
Tennessee	1932	8(±½)	64	124.5	49.0	25.6	56.4	Wheeler 1933
Tennessee	1937–39	8 to 9	354	127.9	50.4	25.7	56.6	O'Brien 1941
Alabama	1937–39	8 to 9	483	127.7	50.3	25.4	56.0	O'Brien 1941
Alabama	1942–52	8 to 9	146	130.6	51.4	28.3	62.4	Dreizen 1953
Alabama	1947	8(±½)	49	126.3	49.7	24.5	54.1	Martin 1948
Louisiana	1950–51	8±½	58	127.2	50.1	25.9	57.2	Moschette n.p. (b)
Texas	1929–31	8±½	230	126.0	49.6	24.7	54.5	Whitaere 1939
Texas	1937–39	8 to 9	415	128.7	50.7	26.5	58.5	O'Brien 1941
Western:								
Wyoming	1929–34	8±½	69	126.0	49.6	24.9	54.9	Follstad 1938
Colorado	1934–41	8 to 9	99	132.8	52.3	28.0	61.7	Duval 1942
Colorado	1937–39	8 to 9	362	128.2	50.5	25.6	56.4	O'Brien 1941
Utah	(1931–35)	8±½	1,572	126.2	49.7	25.2	55.6	Brown 1936
Utah	(1937)	8±½	18	127.8	50.3	27.1	59.8	Brown 1942
Utah	1937–39	8 to 9	308	129.3	50.9	26.0	57.4	O'Brien 1941
Utah	1950–51	8 to 9	11	130.0	51.2	26.6	58.7	Wilcox n.p. (a)
Utah	1954–55	8 to 9	166	129.5	51.0	27.2	60.0	Wilcox n.p. (b)
California	1923	8.0	14	128.5	50.6	25.3	55.8	Baldwin 1925b
California	1931–47	8.0	66	130.1	51.2	28.0	61.7	Tuddenham 1954
California	1936–38	8±½	4,492	128.0	50.4	26.7	58.9	Lloyd-Jones 1940, 1941
California	1937–39	8 to 9	264	130.7	51.5	28.1	62.0	O'Brien 1941

See footnote at end of table.

TABLE 7.—EIGHT-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*—Continued

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi-meters*	*Inches*	*Kilo-grams*	*Pounds*	
General Regional:								
Northeast	1922–24	8±½	529	125.5	49.4	25.6	56.5	⎫
North Central	1922–24	8±½	509	125.0	49.2	25.1	55.4	⎬Palmer 1935
South (Central)	1922–24	8±½	511	124.7	49.1	24.6	54.2	⎪
West (Mountain)	1922–24	8±½	130	125.0	49.2	24.4	53.9	⎭
N. E., N. C., West	(1926–30)	8±½	147	131.1	51.6	27.9	61.5	Gray 1931
U. S. (16 States and D. C.)	1937–39	8 to 9	5,893	128.7	50.7	26.4	58.3	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 7a.—*Standards used for 8-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	*Inches*	*Kilo-grams*	*Pounds*	
Baldwin-Wood	Short	119	47	22.7	50	⎫
	Medium	127	50	26.3	58	⎬Baldwin 1923
	Tall	135	53	30.4	67	⎭
Stuart-Meredith	10th percentile	123.1	48.5	23.2	51.2	⎫
	25th percentile	126.6	49.8	25.2	55.5	⎪
	50th percentile	130.0	51.2	27.3	60.1	⎬Stuart 1946b
	75th percentile	134.2	52.8	29.7	65.5	⎪
	90th percentile	137.3	54.1	33.1	73.0	⎭

TABLE 8.—NINE-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	9±1½	84	130.8	51.5	27.1	59.8	Clayton 1940
Maine	1936–40	9±1½	99	131.8	51.9	28.2	62.2	Clayton 1944
Massachusetts	1922–34	9±1¼	672	128.8	50.7	27.5	60.7	Shuttleworth 1939
Massachusetts	(1930–42)	9±1/12	40	131.9	51.9	27.7	61.0	Vickers 1943
Massachusetts	1935–40	9±1½	12	137.8	54.3	34.2	75.4	Miller 1943
New York	1920–23	9 to 10	19	129.8	51.1	26.5	58.4	Johnson 1925
New York	(<1928)	9 to 10	117	134.9	53.1	28.5	62.9	Schwartz 1928
New York	(<1933)	9±1/6	31	134.8	53.1	30.0	66.1	Freeman 1933
New York	1940–55	9 to 10	39	137.3	54.1	31.4	69.2	Taylor n.p.
New York	1948–51	9±1½	17	136.1	53.6	31.7	69.8	Young n.p.
Pennsylvania	1937–39	9 to 10	316	133.4	52.5	29.3	64.7	O'Brien 1941
North Central:								
Ohio	1931–42	9.0	197	135.4	53.3	31.0	68.4	Simmons 1944
Ohio	1937–39	9 to 10	576	133.4	52.5	28.8	63.6	O'Brien 1941
Ohio	1948–51	9 to 10	97	136.9	53.9	31.8	70.1	Patton n.p.
Illinois	(1923–37)	9(±½)	170	128.8	50.7	25.8	56.9	Hardy 1938
Illinois	(1930–36)	9.0	109	134.4	52.9	29.1	64.1	Richey 1937
Illinois	(1936–37)	9 to 10	8	128.5	50.6	26.0	57.3	Schlutz 1938
Illinois	1937–39	9 to 10	353	133.8	52.7	29.6	65.2	O'Brien 1941
Illinois	1939–40	9 to 10	8	134.3	52.9	31.2	68.8	Johnston 1943
Michigan	(<1936)	9±1½	221	134.6	53.0	28.0	61.7	Steggerda 1936
Michigan	1937–39	9 to 10	360	133.6	52.6	29.3	64.5	O'Brien 1941
Michigan	1954	9±1½	91	134.1	52.8	31.9	70.3	Martin 1955
Minnesota	1932–33	9(±½)	301	135.1	53.2	28.2	62.1	Weisman 1935
Minnesota	1937–39	9 to 10	687	134.3	52.9	29.6	65.3	O'Brien 1941
Minnesota	1938–39	9±1½	152	131.2	51.7	27.6	60.8	Matheny 1947
Iowa	1920–27	9±1½	106	133.4	52.5	29.2	64.4	Meredith 1941a
Iowa	1920–34	9±1½	478	133.7	52.6	29.0	63.9	Meredith 1935
Iowa	1923–27	9±1½	51	129.6	51.0	27.4	60.4	Baldwin 1930
Iowa	1930–37	9±1½	112	135.0	53.1	30.4	67.0	Meredith 1941a
Iowa	1937–39	9 to 10	483	133.6	52.6	29.3	64.6	O'Brien 1941
Iowa	1948–51	9 to 10	55	135.6	53.4	32.1	70.8	Eppright 1954
Nebraska	1937–39	9 to 10	232	134.8	53.1	29.1	64.2	O'Brien 1941
Kansas	1937–39	9 to 10	332	133.5	52.6	29.0	64.0	O'Brien 1941
Kansas	1948–51	9 to 10	109	135.8	53.5	31.3	69.0	Marlatt n.p.
Southern:								
Maryland	1937–40	9 to 10	997	132.2	52.0	28.8	63.4	Wolff 1941, 1942
Maryland	1947	9(±½)	74	133.1	52.4	29.4	64.8	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	9 to 10	608	133.8	52.7	29.6	65.3	O'Brien 1941
Virginia	1918–30	9±1½	17	129.3	50.9			Bean 1931
Virginia	1944–47	9±1½	9	131.8	51.9	27.2	59.9	Dean 1955
Virginia	1951–52	9±1½	25	134.4	52.9	30.0	66.1	Dean n.p.
South Carolina	1940–42	9±1½	52	130.5	51.4	27.4	60.4	Moser 1945
Tennessee	1932	9(±½)	87	128.0	50.4	27.3	60.2	Wheeler 1933
Tennessee	1937–39	9 to 10	343	132.8	52.3	27.9	61.5	O'Brien 1941
Alabama	1937–39	9 to 10	495	132.4	52.1	27.8	61.2	O'Brien 1941
Alabama	1942–52	9 to 10	106	135.4	53.3	31.6	69.6	Dreizen 1953
Alabama	1947	9(±½)	30	133.4	52.5	27.9	61.4	Martin 1948
Louisiana	1948–49	9±1½	29	136.9	53.9	32.3	71.2	Moschette n.p. (a)
Louisiana	1950–51	9±1½	62	131.9	51.9	28.6	63.0	Moschette n.p. (b)
Texas	1929–31	9±1½	267	130.3	51.3	26.7	58.8	Whitacre 1939
Texas	1937–39	9 to 10	431	134.2	52.8	29.6	65.2	O'Brien 1941
Western:								
Wyoming	1929–34	9±1½	85	131.3	51.7	27.3	60.1	Follstad 1938
Colorado	1934–41	9 to 10	95	137.1	54.0	30.1	66.4	Duval 1942
Colorado	1937–39	9 to 10	366	133.6	52.6	28.5	62.9	O'Brien 1941
Utah	(1931–35)	9±1½	1,551	131.3	51.7	27.7	61.0	Brown 1936
Utah	(1937)	9±1½	32	133.1	52.4	28.4	62.7	Brown 1942
Utah	1937–39	9 to 10	364	134.6	53.0	29.0	64.0	O'Brien 1941
Utah	1950–51	9 to 10	14	136.7	53.8	30.5	67.3	Wilcox n.p. (a)
Utah	1954–55	9 to 10	142	135.1	53.2	30.2	66.6	Wilcox n.p. (b)
California	1923	9.0	29	132.8	52.3	29.9	65.9	Baldwin 1925b
California	1931–47	9.0	66	136.0	53.5	31.7	69.9	Tuddenham 1954
California	1936–38	9±½	4,641	133.4	52.5	29.8	65.6	Lloyd-Jones 1940, 1941
California	1937–39	9 to 10	296	135.9	53.5	31.2	68.8	O'Brien 1941

See footnote at end of table.

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Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
General Regional:								
Northeast	1922–24	9±½	587	130.3	51.3	28.0	61.8	} Palmer 1935
North Central	1922–24	9±½	546	130.6	51.4	27.6	60.9	
South (Central)	1922–24	9±½	531	130.0	51.2	27.0	59.6	
West (Mountain)	1922–24	9±½	149	130.6	51.4	27.4	60.3	
N. E., N. C., West	(1926–30)	9±½	167	135.8	53.5	30.9	68.1	Gray 1931
U. S. (16 States and D. C.)	1937–39	9 to 10	6,242	133.8	52.7	29.2	64.3	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 8a.—*Standards used for 9-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	124	49	24.9	55	} Baldwin 1923
	Medium	132	52	29.0	64	
	Tall	140	55	32.6	72	
Stuart-Meredith	10th percentile	128.3	50.5	25.5	56.3	} Stuart 1946b
	25th percentile	131.6	51.8	27.7	61.1	
	50th percentile	135.5	53.3	29.9	66.0	
	75th percentile	139.8	55.0	32.8	72.3	
	90th percentile	142.6	56.1	36.7	81.0	

TABLE 9.—TEN-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	10±½	105	136.1	53.6	30.1	66.3	Clayton 1940
Maine	1936–40	10±½	104	136.1	53.6	30.3	66.7	Clayton 1944
Massachusetts	1922–34	10±¼	704	133.9	52.7	30.3	66.8	Shuttleworth 1939
Massachusetts	(1930–42)	10±1/12	26	137.0	53.9	31.0	68.2	Vickers 1943
Massachusetts	1935–40	10±½	8	144.3	56.8	33.9	74.7	Miller 1943
New York	1920–23	10 to 11	14	135.6	53.4	29.7	65.5	Johnson 1925
New York	(<1928)	10 to 11	148	137.7	54.2	30.3	66.9	Schwartz 1928
New York	(<1933)	10±1/6	32	143.4	56.5	34.5	76.1	Freeman 1933
New York	1940–55	10 to 11	45	141.3	55.6	34.7	76.4	Taylor n.p.
New York	1948–51	10±½	17	137.4	54.1	32.3	71.3	Young n.p.
Pennsylvania	1937–39	10 to 11	345	137.1	54.0	31.7	69.9	O'Brien 1941
North Central:								
Ohio	1931–42	10.0	210	141.0	55.5	34.8	76.8	Simmons 1944
Ohio	1937–39	10 to 11	581	138.2	54.4	31.6	69.6	O'Brien 1941
Ohio	1948–51	10 to 11	135	141.5	55.7	34.8	76.7	Patton n.p.
Illinois	(1923–37)	10(±½)	193	134.4	52.9	28.8	63.5	Hardy 1938
Illinois	(1930–36)	10.0	127	140.0	55.1	32.7	72.0	Richey 1937
Illinois	1937–39	10 to 11	397	138.9	54.7	32.5	71.6	O'Brien 1941
Michigan	(<1936)	10±½	192	139.2	54.8	30.5	67.2	Steggerda 1936
Michigan	1937–39	10 to 11	465	138.5	54.5	32.2	71.0	O'Brien 1941
Michigan	1954	10±½	114	138.2	54.4	35.2	77.6	Martin 1955
Minnesota	1932–33	10(±½)	296	140.7	55.4	33.2	73.1	Weisman 1935
Minnesota	1937–39	10 to 11	617	138.5	54.5	32.1	70.8	O'Brien 1941
Minnesota	1938–39	10±½	161	136.0	53.5	30.1	66.4	Matheny 1947
Iowa	1920–27	10±½	87	139.0	54.7	32.3	71.2	Meredith 1941a
Iowa	1920–34	10±½	390	138.9	54.7	32.5	71.6	Meredith 1935
Iowa	1923–27	10±½	53	135.3	53.3	30.4	67.1	Baldwin 1930
Iowa	1930–37	10±½	109	139.8	55.0	33.3	73.4	Meredith 1941a
Iowa	1937–39	10 to 11	554	138.0	54.3	32.0	70.6	O'Brien 1941
Iowa	1948–51	10 to 11	60	139.5	54.9	33.7	74.3	Eppright 1954
Nebraska	1937–39	10 to 11	247	139.3	54.8	32.3	71.1	O'Brien 1941
Kansas	1937–39	10 to 11	359	138.8	54.6	31.9	70.4	O'Brien 1941
Kansas	1948–51	10 to 11	151	139.8	55.0	33.9	74.7	Marlatt n.p.
Southern:								
Maryland	1937–40	10 to 11	1,027	137.1	54.0	31.4	69.2	Wolff 1941, 1942
Maryland	1947	10(±½)	72	137.9	54.3	32.4	71.4	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	10 to 11	604	138.5	54.5	32.3	71.1	O'Brien 1941
Virginia	1918–30	10±½	24	137.4	54.1			Bean 1931
Virginia	1951–52	10±½	25	139.7	55.0	34.0	75.0	Dean n.p.
South Carolina	1940–42	10±½	46	134.6	53.0	29.2	64.4	Moser 1945
Tennessee	1932	10(±½)	83	137.1	54.0	30.9	68.1	Wheeler 1933
Tennessee	1937–39	10 to 11	381	137.5	54.1	30.4	67.1	O'Brien 1941
Alabama	1937–39	10 to 11	548	137.6	54.2	30.8	67.9	O'Brien 1941
Alabama	1942–52	10 to 11	107	140.2	55.2	34.1	75.1	Dreizen 1953
Alabama	1947	10(±½)	61	138.2	54.4	31.0	68.4	Martin 1948
Louisiana	1948–49	10±½	81	140.2	55.2	33.2	73.2	Moschette n.p. (a)
Louisiana	1950–51	10±½	60	136.6	53.8	30.7	67.7	Moschette n.p. (b)
Texas	1929–31	10±½	325	135.4	53.3	29.6	65.3	Whitacre 1939
Texas	1937–39	10 to 11	434	139.4	54.9	32.7	72.2	O'Brien 1941
Western:								
Wyoming	1929–34	10±½	78	135.9	53.5	30.1	66.4	Follstad 1938
Colorado	1934–41	10 to 11	76	141.6	55.7	32.5	71.6	Duval 1942
Colorado	1937–39	10 to 11	399	138.4	54.5	31.0	68.3	O'Brien 1941
Utah	(1931–35)	10±½	1,633	136.1	53.6	30.3	66.9	Brown 1936
Utah	(1937)	10±½	44	135.9	53.5	30.9	68.2	Brown 1942
Utah	1937–39	10 to 11	441	138.9	54.7	31.6	69.6	O'Brien 1941
Utah	1954–55	10 to 11	74	139.7	55.0	33.8	74.5	Wilcox n.p. (b)
Oregon	1950	10±1/6	208	138.8	54.6	32.9	72.5	Meredith 1953
California	1923	10.0	35	136.7	53.8	31.3	68.9	Baldwin 1925b
California	1931–47	10.0	66	141.3	55.6	35.1	77.4	Tuddenham 1954
California	1936–38	10±½	4,878	138.2	54.4	32.8	72.3	Lloyd-Jones 1940, 1941
California	1937–39	10 to 11	274	140.8	55.4	34.8	76.7	O'Brien 1941

See footnote at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi-meters	Inches	Kilo-grams	Pounds	
General Regional:								
Northeast	1922–24	10±½	557	135.1	53.2	30.5	67.3	⎫
North Central	1922–24	10±½	477	135.4	53.3	30.5	67.2	⎬Palmer 1935
South (Central)	1922–24	10±½	536	134.9	53.1	30.2	66.5	⎪
West (Mountain)	1922–24	10±½	128	135.1	53.2	29.6	65.2	⎭
N. E., N. C., West	(1926–30)	10±½	173	141.2	55.6	34.5	76.1	Gray 1931
U. S. (16 States and D. C.)	1937–39	10 to 11	6,646	138.5	54.5	31.9	70.4	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 9a.—*Standards used for 10-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	Inches	Kilo-grams	Pounds	
Baldwin-Wood	Short	130	51	27.7	61	⎫
	Medium	137	54	31.8	70	⎬Baldwin 1923
	Tall	145	57	36.3	80	⎭
Stuart-Meredith	10th percentile	132.8	52.3	27.7	61.1	⎫
	25th percentile	136.3	53.7	30.1	66.3	⎪
	50th percentile	140.3	55.2	32.6	71.9	⎬Stuart 1946b
	75th percentile	144.4	56.9	36.1	79.6	⎪
	90th percentile	147.5	58.1	40.8	89.0	⎭

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
	Years		*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	11 ± ½	93	139.7	55.0	31.8	70.0	Clayton 1940
Maine	1936–40	11 ± ½	120	140.7	55.4	32.5	71.6	Clayton 1944
Massachusetts	1922–34	11 ± ¼	709	138.8	54.6	33.4	73.6	Shuttleworth 1939
Massachusetts	1935–40	11 ± ½	15	149.2	58.7	41.2	90.8	Miller 1943
New York	1920–23	11 to 12	9	137.9	54.3	31.9	70.4	Johnson 1925
New York	(<1928)	11 to 12	132	143.8	56.6	34.5	76.0	Schwartz 1928
New York	(<1933)	11 ± ⅙	27	146.8	57.8	35.8	78.9	Freeman 1933
New York	1934–39	11 to 12	17	144.3	56.8	35.6	78.5	Webster 1941
New York	1940–55	11 to 12	46	144.4	56.9	39.7	87.3	Taylor n.p.
New York	1948–51	11 ± ½	9	142.5	56.1	36.3	80.1	Young n.p.
Pennsylvania	1937–39	11 to 12	336	142.6	56.1	35.5	78.3	O'Brien 1941
North Central:								
Ohio	1931–42	11.0	189	145.9	57.4	38.8	85.6	Simmons 1944
Ohio	1937–39	11 to 12	606	142.3	56.0	34.2	75.5	O'Brien 1941
Ohio	1948–51	11 to 12	114	145.5	57.3	37.8	83.3	Patton n.p.
Illinois	(1923–37)	11(± ½)	191	138.7	54.6	31.0	68.3	Hardy 1938
Illinois	(1930–36)	11.0	143	145.0	57.1	35.7	78.7	Richey 1937
Illinois	1937–39	11 to 12	409	143.4	56.5	35.7	78.7	O'Brien 1941
Michigan	(<1936)	11 ± ½	189	144.3	56.8	33.8	74.5	Steggerda 1936
Michigan	1937–39	11 to 12	409	142.9	56.3	35.4	78.1	O'Brien 1941
Michigan	1954	11 ± ½	103	144.3	56.8	39.8	87.8	Martin 1955
Minnesota	1932–33	11(± ½)	257	147.1	57.9	35.5	78.2	Weisman 1935
Minnesota	1937–39	11 to 12	629	143.3	56.4	35.3	77.8	O'Brien 1941
Minnesota	1938–39	11 ± ½	179	149.5	58.9	32.8	72.3	Matheny 1947
Iowa	1920–27	11 ± ½	100	143.3	56.4	35.1	77.4	Meredith 1941a
Iowa	1920–34	11 ± ½	368	143.2	56.4	35.3	77.8	Meredith 1935
Iowa	1923–27	11 ± ½	65	139.7	55.0	33.8	74.5	Baldwin 1930
Iowa	1930–37	11 ± ½	97	144.7	57.0	36.5	80.5	Meredith 1941a
Iowa	1937–39	11 to 12	501	143.1	56.3	35.6	78.4	O'Brien 1941
Iowa	1948–51	11 to 12	50	144.1	56.7	37.9	83.6	Eppright 1954
Nebraska	1937–39	11 to 12	202	142.3	56.0	34.1	75.1	O'Brien 1941
Kansas	1937–39	11 to 12	354	143.9	56.7	34.7	76.6	O'Brien 1941
Kansas	1948–51	11 to 12	137	145.8	57.4	38.0	83.8	Marlatt n.p.
Southern:								
Maryland	1937–40	11 to 12	1,060	141.8	55.8	34.6	76.2	Wolff 1941, 1942
Maryland	1947	11(± ½)	72	142.5	56.1	36.5	80.4	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	11 to 12	582	143.0	56.3	35.1	77.3	O'Brien 1941
Virginia	1918–30	11 ± ½	14	141.6	55.7			Bean 1931
Virginia	1951–52	11 ± ½	19	140.8	55.4	34.0	74.9	Dean n.p.
South Carolina	1940–42	11 ± ½	62	140.8	55.4	33.1	72.9	Moser 1945
Tennessee	1932	11(± ½)	91	139.2	54.8	33.5	73.9	Wheeler 1933
Tennessee	1937–39	11 to 12	404	141.4	55.7	32.8	72.4	O'Brien 1941
Alabama	1937–39	11 to 12	510	142.0	55.9	33.3	73.4	O'Brien 1941
Alabama	1942–52	11 to 12	97	145.0	57.1	37.6	82.9	Dreizen 1953
Alabama	1947	11(± ½)	54	141.2	55.6	33.0	72.7	Martin 1948
Louisiana	1948–49	11 ± ½	95	144.0	56.7	36.1	79.5	Moschette n.p. (a)
Louisiana	1950–51	11 ± ½	63	142.5	56.1	35.1	77.3	Moschette n.p. (b)
Texas	1929–31	11 ± ½	287	139.7	55.0	32.1	70.8	Whitacre 1939
Texas	1937–39	11 to 12	480	143.7	56.6	35.7	78.7	O'Brien 1941
Western:								
Wyoming	1929–34	11 ± ½	59	141.0	55.5	32.7	72.1	Follstad 1938
Colorado	1934–41	11 to 12	51	146.8	57.8	35.6	78.5	Duval 1942
Colorado	1937–39	11 to 12	372	143.1	56.3	33.9	74.8	O'Brien 1941
Utah	(1931–35)	11 ± ½	1,460	140.7	55.4	33.2	73.3	Brown 1936
Utah	(1937)	11 ± ½	29	140.5	55.3	33.2	73.2	Brown 1942
Utah	1937–39	11 to 12	411	142.8	56.2	34.0	75.0	O'Brien 1941
Utah	1950–51	11 to 12	13	145.8	57.4	36.0	79.3	Wilcox n.p. (a)
Utah	1954–55	11 to 12	6	137.9	54.3	36.8	81.2	Wilcox n.p. (b)
California	1923	11.0	68	142.7	56.2	34.0	77.9	Baldwin 1925b
California	1931–47	11.0	66	146.5	57.7	38.9	85.8	Tuddenham 1954
California	1936–38	11 ± ½	5,203	143.0	56.3	36.0	79.4	Lloyd-Jones 1940, 1941
California	1937–39	11 to 12	283	146.1	57.5	38.1	84.1	O'Brien 1941

See footnote at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi-meters*	*Inches*	*Kilo-grams*	*Pounds*	
General Regional:								
Northeast	1922–24	11±½	553	140.0	55.1	34.0	74.9	⎫
North Central	1922–24	11±½	515	140.2	55.2	33.6	74.0	⎬ Palmer 1935
South (Central)	1922–24	11±½	552	139.7	55.0	32.7	72.2	⎪
West (Mountain)	1922–24	11±½	115	138.9	54.7	31.4	69.3	⎭
N. E., N. C., West	(1926–30)	11±½	201	145.4	57.2	37.6	82.9	Gray 1931
U. S. (16 States and D. C.)	1937–39	11 to 12	6,488	143.0	56.3	34.8	76.8	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 10a.—*Standards used for 11-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	*Inches*	*Kilo-grams*	*Pounds*	
Baldwin-Wood	Short	135	53	30.4	67	⎫
	Medium	142	56	34.9	77	⎬ Baldwin 1923
	Tall	150	59	39.9	88	⎭
Stuart-Meredith	10th percentile	137.3	54.1	30.1	66.3	⎫
	25th percentile	140.5	55.3	32.5	71.6	⎪
	50th percentile	144.2	56.8	35.2	77.6	⎬ Stuart 1946b
	75th percentile	149.2	58.7	39.6	87.2	⎪
	90th percentile	151.8	59.8	45.0	99.3	⎭

TABLE 11.—TWELVE-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	12±½	78	144.3	56.8	35.8	78.9	Clayton 1940
Maine	1936–40	12±½	125	146.1	57.5	36.5	80.5	Clayton 1944
Maine	1948–51	12±½	8	150.4	59.2	41.1	90.5	Clayton n.p.
Massachusetts	1922–34	12±¼	711	143.8	56.6	36.8	81.2	Shuttleworth 1939
Massachusetts	1935–40	12±½	10	154.0	60.6	46.3	102.1	Miller 1943
New York	1926–31	12 to 13	6	135.7	53.4	37.8	83.3	Topper 1932
New York	(<1928)	12 to 13	103	147.8	58.2	37.7	83.2	Schwartz 1928
New York	(<1933)	12±⅙	34	150.3	59.2	40.4	89.1	Freeman 1933
New York	1934–39	12 to 13	25	148.7	58.5	38.4	84.7	Webster 1941
New York	1940–55	12 to 13	28	146.2	57.6	42.0	92.4	Taylor n.p.
New York	1948–51	12±½	26	150.9	59.4	43.8	96.5	Young n.p.
Pennsylvania	1937–39	12 to 13	413	147.7	58.1	39.0	85.9	O'Brien 1941
North Central:								
Ohio	1931–42	12.0	211	151.4	59.6	43.2	95.2	Simmons 1944
Ohio	1937–39	12 to 13	558	147.5	58.1	37.7	83.2	O'Brien 1941
Ohio	1948–51	12 to 13	45	149.6	58.9	39.7	87.5	Patton n.p.
Illinois	(1923–27)	12(±½)	108	142.7	56.2	33.7	74.3	Hardy 1938
Illinois	(1930–36)	12.0	165	149.9	59.0	39.3	86.7	Richey 1937
Illinois	(<1935)	12 (to 13)	85	145.0	57.1	37.2	82.1	Dimock 1935
Illinois	1937–39	12 to 13	411	148.6	58.5	39.1	86.2	O'Brien 1941
Michigan	(<1936)	12±½	184	149.9	59.0	37.6	82.9	Steggerda 1936
Michigan	1937–39	12 to 13	419	146.5	57.7	37.5	82.7	O'Brien 1941
Michigan	1954	12±½	100	147.1	57.9	42.0	92.5	Martin 1955
Minnesota	1932–33	12(±½)	188	149.4	58.8	37.9	83.6	Weisman 1935
Minnesota	1937–39	12 to 13	542	148.4	58.4	39.0	86.0	O'Brien 1941
Minnesota	1938–39	12±½	178	145.7	57.4	36.7	80.9	Matheny 1947
Iowa	1920–27	12±½	99	147.6	58.1	38.2	84.2	Meredith 1941a
Iowa	1920–34	12±½	340	147.8	58.2	38.7	85.3	Meredith 1935
Iowa	1923–27	12±½	66	145.2	57.2	37.6	82.8	Baldwin 1930
Iowa	1930–37	12±½	94	149.8	59.0	39.5	87.1	Meredith 1941a
Iowa	1937–39	12 to 13	321	147.1	57.9	38.0	83.8	O'Brien 1941
Iowa	1948–51	12 to 13	90	148.3	58.4	40.8	89.9	Eppright 1954
Nebraska	1937–39	12 to 13	162	146.5	57.7	36.6	80.6	O'Brien 1941
Kansas	1937–39	12 to 13	518	149.3	58.8	39.6	87.3	O'Brien 1941
Kansas	1948–51	12 to 13	65	148.3	58.4	40.2	88.6	Marlatt, n.p.
Southern:								
Maryland	1937–40	12 to 13	1,102	147.0	57.9	38.4	84.6	Wolff 1941, 1942
Maryland	1947	12(±½)	42	146.6	57.7	38.4	84.7	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	12 to 13	917	149.4	58.8	40.1	88.3	O'Brien 1941
Virginia	1918–30	12±½	26	145.4	57.2			Bean 1931
Virginia	1944–47	12±½	9	149.1	58.7	39.0	85.9	Dean 1955
Virginia	1951–52	12±½	6	144.0	56.7	34.3	75.7	Dean n.p.
South Carolina	1940–42	12±½	73	144.8	57.0	36.1	79.5	Moser 1945
Tennessee	1932	12(±½)	80	144.4	56.9	36.7	80.9	Wheeler 1933
Tennessee	1937–39	12 to 13	336	146.8	57.8	36.5	80.5	O'Brien 1941
Alabama	1937–39	12 to 13	533	147.0	57.9	36.4	80.3	O'Brien 1941
Alabama	1942–52	12 to 13	94	150.1	59.1	42.1	92.8	Dreizen 1953
Alabama	1947	12(±½)	42	147.3	58.0	36.7	80.9	Martin 1948
Louisiana	1948–49	12±½	75	146.6	57.7	39.1	86.1	Mosehette n.p. (a)
Texas	1929–31	12±½	125	143.0	56.3	33.8	74.5	Whitacre 1939
Texas	1937–39	12 to 13	443	148.9	58.6	39.2	86.5	O'Brien 1941
Western:								
Wyoming	1929–34	12±½	42	145.5	57.3	35.6	78.4	Follstad 1938
Colorado	1934–41	12 to 13	55	151.4	59.6	39.0	86.0	Duval 1942
Colorado	1937–39	12 to 13	414	148.4	58.4	37.6	82.8	O'Brien 1941
Utah	(1931–35)	12±½	1,407	146.3	57.6	36.6	80.7	Brown 1936
Utah	(1937)	12±½	24	144.5	56.9	36.2	79.8	Brown 1942
Utah	1937–39	12 to 13	347	147.2	58.0	36.8	81.1	O'Brien 1941
Utah	1950–51	12 to 13	13	146.6	57.7	34.8	76.8	Wilcox n.p. (a)
California	1923	12.0	63	147.3	58.0	38.1	84.1	Baldwin 1925b
California	1931–47	12.0	66	152.2	59.9	43.3	95.5	Tuddenham 1954
California	1936–38	12±½	5,463	148.1	58.3	39.6	87.3	Lloyd-Jones 1940, 1941
California	1937–39	12 to 13	278	150.7	59.3	41.9	92.3	O'Brien 1941

See footnote at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
General Regional:								
Northeast	1922–24	12±½	569	144.3	56.8	36.8	81.1	⎫
North Central	1922–24	12±½	494	144.3	56.8	36.2	79.9	⎬ Palmer 1935
South (Central)	1922–24	12±½	539	144.3	56.8	36.1	79.6	⎪
West (Mountain)	1922–24	12±½	112	144.3	56.8	35.3	77.8	⎭
N. E., N. C., West	(1926–30)	12±½	247	150.4	59.2	40.7	89.7	Gray 1931
U. S. (16 States and D. C.)	1937–39	12 to 13	6,612	148.2	58.2	38.5	84.8	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 11a.—*Standards used for 12-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	137	54	32.2	71	⎫
	Medium	147	58	38.6	85	⎬ Baldwin 1923
	Tall	155	61	43.5	96	⎭
Stuart-Meredith	10th percentile	142.4	56.1	32.7	72.0	⎫
	25th percentile	145.2	57.2	35.2	77.5	⎪
	50th percentile	149.6	58.9	38.3	84.4	⎬ Stuart 1946b
	75th percentile	153.5	60.4	43.5	96.0	⎪
	90th percentile	157.9	62.2	49.7	109.6	⎭

TABLE 12.—THIRTEEN-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi-meters*	*Inches*	*Kilo-grams*	*Pounds*	
Northeast:								
Maine	1934–36	13±1⁄2	92	151.1	59.5	41.1	90.7	Clayton 1940
Maine	1936–40	13±1⁄2	90	152.7	60.1	41.8	92.1	Clayton 1944
Maine	1948–51	13±1⁄2	31	156.2	61.5	45.6	100.5	Clayton n.p.
Massachusetts	1922–34	13±1⁄4	711	149.6	58.9	41.2	90.9	Shuttleworth 1939
Massachusetts	1935–40	13±1⁄2	13	159.0	62.6	48.6	107.1	Miller 1943
Massachusetts	1939–45	13 (to 14)	60	162.6	64.0	53.5	118.0	Gallagher 1953
New York	1926–31	13 to 14	13	143.6	56.5	41.7	91.9	Topper 1932
New York	(<1928)	13 to 14	106	153.9	60.6	41.8	92.2	Schwartz 1928
New York	(<1933)	13±1⁄6	31	156.4	61.6	44.8	98.8	Freeman 1933
New York	1934–39	13 to 14	28	158.6	62.4	44.1	97.2	Webster 1941
New York	1940–55	13 to 14	10	149.4	58.8	41.6	91.5	Taylor n.p.
New York	1948–51	13±1⁄2	46	156.5	61.6	48.0	105.8	Young n.p.
Pennsylvania	1937–39	13 to 14	461	153.5	60.4	43.6	96.2	O'Brien 1941
North Central:								
Ohio	1931–42	13.0	196	157.5	62.0	47.9	105.7	Simmons 1944
Ohio	1937–39	13 to 14	519	153.7	60.5	42.5	93.7	O'Brien 1941
Ohio	1948–51	13 to 14	13	152.4	60.0	44.9	99.0	Patton n.p.
Illinois	(1930–36)	13.0	194	155.7	61.3	43.8	96.6	Richey 1937
Illinois	(<1935)	13 (to 14)	156	151.9	59.8	42.0	92.5	Dimock 1935
Illinois	1937–39	13 to 14	406	154.0	60.6	43.5	96.0	O'Brien 1941
Michigan	(<1936)	13±1⁄2	183	155.2	61.1	41.0	90.4	Steggerda 1936
Michigan	1937–39	13 to 14	278	152.4	60.0	42.2	93.0	O'Brien 1941
Michigan	1954	13±1⁄2	111	154.2	60.7	46.7	103.0	Martin 1954
Minnesota	1932–33	13(±1⁄2)	131	155.4	61.2	41.4	91.3	Weisman 1935
Minnesota	1937–39	13 to 14	601	154.6	60.9	43.8	96.6	O'Brien 1941
Minnesota	1938–39	13±1⁄2	182	151.2	59.2	40.9	90.2	Matheny 1947
Iowa	1920–27	13±1⁄2	88	152.6	60.1	42.3	93.3	Meredith 1941a
Iowa	1920–34	13±1⁄2	345	153.3	60.4	43.6	96.1	Meredith 1935
Iowa	1923–27	13±1⁄2	63	152.3	60.0	42.2	93.0	Baldwin 1930
Iowa	1930–37	13±1⁄2	112	155.5	61.2	43.7	96.3	Meredith 1941a
Iowa	1937–39	13 to 14	229	153.1	60.3	43.3	95.5	O'Brien 1941
Iowa	1948–51	13 to 14	44	156.5	61.6	47.9	105.6	Eppright 1954
Nebraska	1937–39	13 to 14	134	153.6	60.5	42.2	93.0	O'Brien 1941
Kansas	1937–39	13 to 14	512	154.8	60.9	43.4	95.6	O'Brien 1941
Kansas	1948–51	13 to 14	13	153.1	60.3	43.6	96.1	Marlatt n.p.
Southern:								
Maryland	1937–40	13 to 14	1,136	153.1	60.3	43.5	96.0	Wolff 1941, 1942
Maryland	1947	13(±1⁄2)	10	151.6	59.7	43.3	95.4	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	13 to 14	1,117	155.1	61.1	44.4	97.9	O'Brien 1941
Virginia	1918–30	13±1⁄2	15	152.1	59.9	--------	--------	Bean 1931
Virginia	1944–47	13±1⁄2	13	152.1	59.9	40.9	90.2	Dean 1955
South Carolina	1940–42	13±1⁄2	29	149.8	59.0	38.9	85.7	Moser 1945
Tennessee	1932	13(±1⁄2)	77	151.5	59.6	39.9	88.0	Wheeler 1933
Tennessee	1937–39	13 to 14	344	152.3	60.0	41.1	90.5	O'Brien 1941
Alabama	1937–39	13 to 14	458	152.6	60.1	40.3	88.9	O'Brien 1941
Alabama	1942–52	13 to 14	84	158.2	62.3	49.4	109.0	Dreizen 1953
Alabama	1947	13(±1⁄2)	20	148.3	58.4	37.8	83.4	Martin 1948
Louisiana	1948–49	13 to 14	30	154.4	60.8	43.5	96.0	Moschette n.p. (a)
Texas	1929–31	13±1⁄2	51	147.1	57.9	37.2	82.1	Whitacre 1939
Texas	1937–39	13 to 14	368	154.2	60.7	42.9	94.5	O'Brien 1941
Western:								
Wyoming	1929–34	13±1⁄2	28	149.9	59.0	38.7	85.3	Follstad 1938
Colorado	1934–41	13 to 14	37	156.6	61.7	44.0	97.0	Duval 1942
Colorado	1937–39	13 to 14	328	154.5	60.8	42.2	93.0	O'Brien 1941
Utah	(1931–35)	13±1⁄2	1,518	151.6	59.7	40.6	89.5	Brown 1936
Utah	1937–39	13 to 14	216	152.8	60.2	40.8	89.9	O'Brien 1941
Utah	1950–51	13 to 14	8	157.0	61.8	52.1	114.8	Wilcox n.p. (a)
California	1923	13.0	50	151.6	59.7	41.5	91.5	Baldwin 1925b
California	1925–30	13 to 14	58	153.4	60.4	44.1	97.2	Bissett 1932
California	1931–47	13.0	66	158.8	62.5	48.9	107.8	Tuddenham 1954
California	1936–38	13±1⁄2	5,301	153.9	60.6	44.8	98.8	Lloyd-Jones 1940, 1941
California	1937–39	13 to 14	284	157.4	62.0	47.2	104.1	O'Brien 1941

See footnote at end of table.

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi- meters*	*Inches*	*Kilo- grams*	*Pounds*	
General Regional:								
Northeast_____	1922–24	13±½	546	149.9	59.0	40.7	89.8	} Palmer 1935
North Central_____	1922–24	13±½	517	150.6	59.3	40.9	90.2	
South (Central)_____	1922–24	13±½	509	149.6	58.9	40.0	88.2	
West (Mountain)_____	1922–24	13±½	74	149.9	59.0	39.1	86.3	
N. E., N. C., West_____	(1926–30)	13±½	293	156.4	61.6	44.8	98.8	Gray 1931
U. S. (16 States and D. C.)	1937–39	13 to 14	6,255	154.1	60.7	43.1	95.1	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 12a.—*Standards used for 13-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centi- meters	*Inches*	*Kilo- grams*	*Pounds*	
Baldwin-Wood_____	Short_____	142	56	35.4	78	} Baldwin 1923
	Medium_____	152	60	42.2	93	
	Tall_____	163	64	50.3	111	
Stuart-Meredith_____	10th percentile_____	146.6	57.7	35.0	77.1	} Stuart 1946b
	25th percentile_____	149.7	58.9	38.0	83.7	
	50th percentile_____	155.0	61.0	42.2	93.0	
	75th percentile_____	160.8	63.3	48.9	107.9	
	90th percentile_____	165.3	65.1	55.9	123.2	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	14±½	47	155.4	61.2	42.5	93.9	Clayton 1940
Maine	1936–40	14±½	52	156.7	61.7	45.3	99.9	Clayton 1944
Maine	1948–51	14±½	118	159.8	62.9	49.3	108.7	Clayton n.p.
Massachusetts	1922–34	14±¼	711	156.4	61.6	46.8	103.1	Shuttleworth 1939
Massachusetts	1935–40	14±½	8	165.8	65.3	51.1	112.7	Miller 1943
Massachusetts	1939–45	14 (to 15)	239	167.1	65.8	57.6	127.0	Gallagher 1953
New York	1926–31	14 to 15	10	153.9	60.6	46.6	102.7	Topper 1932
New York	(<1928)	14 to 15	114	159.0	62.6	45.7	100.8	Schwartz 1928
New York	(<1933)	14±⅙	23	160.5	63.2	49.8	109.8	Freeman 1933
New York	1934–39	14 to 15	21	162.7	64.1	53.3	117.5	Webster 1941
New York	1940–55	14 to 15	7	158.4	62.4	48.5	106.8	Taylor n.p.
New York	1948–51	14±½	48	162.1	63.8	54.5	120.1	Young n.p.
Pennsylvania	1937–39	14 to 15	429	159.9	63.0	49.1	108.3	O'Brien 1941
North Central:								
Ohio	1931–42	14.0	179	164.8	64.9	54.0	119.1	Simmons 1944
Ohio	1937–39	14 to 15	356	158.6	62.4	46.5	102.6	O'Brien 1941
Ohio	1948–51	14 to 15	6	163.8	64.5	51.2	112.9	Patton n.p.
Illinois	(1930–36)	14.0	249	161.8	63.7	48.5	106.9	Richey 1937
Illinois	(<1935)	14 (to 15)	184	158.6	62.4	47.9	105.6	Dimock 1935
Illinois	1937–39	14 to 15	282	160.0	63.0	48.8	107.6	O'Brien 1941
Michigan	(<1936)	14±½	192	162.1	63.8	45.9	101.1	Steggerda 1936
Michigan	1937–39	14 to 15	225	159.7	62.9	48.8	107.6	O'Brien 1941
Michigan	1954	14±½	175	161.5	63.6	53.7	118.4	Martin 1955
Minnesota	1932–33	14(±½)	86	159.5	62.8	43.6	96.1	Weisman 1935
Minnesota	1937–39	14 to 15	473	160.8	63.3	49.4	109.0	O'Brien 1941
Minnesota	1938–39	14±½	183	157.0	61.8	45.9	101.2	Matheny 1947
Iowa	1920–27	14±½	94	158.3	62.3	47.0	103.6	Meredith 1941a
Iowa	1920–34	14±½	345	159.4	62.8	48.6	107.1	Meredith 1935
Iowa	1923–27	14±½	69	155.5	61.2	46.0	101.4	Baldwin 1930
Iowa	1930–37	14±½	152	162.7	64.1	49.9	110.0	Meredith 1941a
Iowa	1937–39	14 to 15	168	160.3	63.1	48.6	107.1	O'Brien 1941
Iowa	1948–51	14 to 15	40	160.7	63.3	51.4	113.3	Eppright 1954
Nebraska	1937–39	14 to 15	52	159.2	62.7	46.5	102.5	O'Brien 1941
Kansas	1937–39	14 to 15	398	160.3	63.1	48.5	107.0	O'Brien 1941
Southern:								
Maryland	1937–40	14 to 15	1,019	159.6	62.8	49.3	108.6	Wolff 1941, 1942
Maryland	1947	14(±½)	7	152.1	59.9	40.2	88.6	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	14 to 15	894	161.3	63.5	49.9	110.0	O'Brien 1941
Virginia	1918–30	14±½	22	154.4	60.8	--------	--------	Bean 1931
Virginia	1944–47	14±½	17	160.0	63.0	46.4	102.4	Dean 1955
South Carolina	1940–42	14±½	19	151.3	59.6	38.2	84.3	Moser 1945
Tennessee	1932	14(±½)	66	153.0	60.2	44.1	97.2	Wheeler 1933
Tennessee	1937–39	14 to 15	195	159.9	63.0	46.9	103.5	O'Brien 1941
Alabama	1937–39	14 to 15	410	159.4	62.8	46.1	101.7	O'Brien 1941
Alabama	1942–52	14 to 15	130	166.4	65.5	56.0	123.5	Dreizen 1953
Alabama	1947	14(±½)	12	159.0	62.6	44.9	99.0	Martin 1948
Louisiana	1948–49	14 to 15	6	151.6	59.7	40.8	90.0	Moschette n.p. (a)
Texas	1937–39	14 to 15	213	159.3	62.7	47.2	104.2	O'Brien 1941
Western:								
Montana	1951–52	14 to 15	26	165.9	65.3	53.1	117.1	Odland n.p.
Wyoming	1929–34	14±½	13	157.5	62.0	43.9	96.7	Follstad 1938
Colorado	1934–41	14 to 15	34	163.9	64.5	48.5	106.9	Duval 1942
Colorado	1937–39	14 to 15	294	159.6	62.8	46.2	101.9	O'Brien 1941
Colorado	1949–50	14 to 15	27	165.4	65.1	52.0	114.7	Dyar n.p.
New Mexico	1949–50	14 to 15	23	160.3	63.1	47.1	103.8	Lantz n.p.
Utah	(1931–35)	14±½	1,592	158.0	62.2	45.6	100.6	Brown 1936
Utah	1937–39	14 to 15	111	157.5	62.0	45.0	99.3	O'Brien 1941
Utah	1950–51	14 to 15	22	165.9	65.3	53.6	118.1	Wilcox n.p. (a)
Washington	1951–52	14 to 15	38	169.9	66.9	57.7	127.1	Esselbaugh n.p.
Oregon	1947–48	14 to 15	141	165.6	65.2	57.0	125.6	Storvick n.p.
California	1923	14.0	26	159.0	62.6	47.7	105.2	Baldwin 1925b
California	1925–30	14 to 15	366	161.7	63.6	50.6	111.5	Bissett 1932
California	1931–47	14.0	66	165.8	65.3	54.8	120.8	Tuddenham 1954
California	1936–38	14±½	4,910	160.5	63.2	49.8	109.8	Lloyd-Jones 1940, 1941
California	1937–39	14 to 15	277	163.8	64.5	53.1	117.0	O'Brien 1941

See footnote at end of table.

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi-meters	Inches	Kilo-grams	Pounds	
General Regional:								
Northeast	1922–24	14±½	397	155.4	61.2	45.2	99.7	} Palmer 1935
North Central	1922–24	14±½	468	155.7	61.3	45.8	101.0	
South (Central)	1922–24	14±½	399	155.7	61.3	44.6	98.4	
West (Mountain)	1922–24	14±½	53	153.4	60.4	41.2	90.9	
N. E., N. C., West	(1926–30)	14±½	373	162.4	63.9	49.3	108.7	Gray 1931
U. S. (16 States and D. C.)	1937–39	14 to 15	4,777	160.3	63.1	48.5	106.9	O'Brien 1941

[1] Dates in parentheses are estimated.

Table 13a.—*Standards used for 14-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	Inches	Kilo-grams	Pounds	
Baldwin-Wood	Short	147	58	39.0	86	} Baldwin 1923
	Medium	160	63	49.0	108	
	Tall	170	67	58.1	128	
Stuart-Meredith	10th percentile	152.1	59.9	39.7	87.5	} Stuart 1946b
	25th percentile	156.5	61.6	43.3	95.5	
	50th percentile	162.7	64.1	48.8	107.6	
	75th percentile	168.4	66.3	55.8	123.1	
	90th percentile	172.4	67.9	62.1	136.9	

TABLE 14.—FIFTEEN-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi- meters	Inches	Kilo- grams	Pounds	
Northeast:								
Maine	1934–36	15±½	29	160.0	63.0	46.7	103.0	Clayton 1940
Maine	1936–40	15±½	19	164.1	64.6	49.6	109.3	Clayton 1944
Maine	1948–51	15±½	134	166.6	65.6	56.0	123.4	Clayton n.p.
Massachusetts	1922–34	15±¼	707	163.1	64.2	52.9	116.7	Shuttleworth 1939
Massachusetts	1939–45	15 (to 16)	320	172.0	67.7	62.6	138	Gallagher 1953
Rhode Island	1948–51	15±½	13	175.0	68.9	63.0	138.8	Tucker n.p.
New York	1926–31	15 to 16	6	156.3	61.5	47.3	104.3	Topper 1932
New York	(<1928)	15 to 16	102	165.6	65.2	51.4	113.3	Schwartz 1928
New York	(<1933)	15±⅙	12	175.9	69.3	57.2	126.1	Freeman 1933
New York	1934–39	15 to 16	19	167.0	65.7	58.2	128.3	Webster 1941
New York	1940–55	15 to 16	7	164.0	64.5	55.1	121.3	Taylor n.p.
New York	1948–51	15±½	13	163.6	64.4	53.4	117.7	Young n.p.
North Central:								
Ohio	1931–42	15.0	146	171.1	67.4	60.0	132.3	Simmons 1944
Illinois	(<1935)	15 (to 16)	106	160.5	63.2	52.3	115.4	Dimock 1935
Illinois	(1930–36)	15.0	246	167.4	65.9	53.4	117.7	Richey 1937
Michigan	(<1936)	15±½	149	168.7	66.4	50.5	111.4	Steggerda 1936
Michigan	1954	15±½	161	169.2	66.6	60.5	133.4	Martin 1955
Minnesota	1938–39	15±½	193	163.0	64.2	51.5	113.5	Matheny 1947
Iowa	1920–27	15±½	106	164.7	64.8	52.9	116.6	Meredith 1941a
Iowa	1920–34	15±½	376	165.2	65.0	54.9	121.0	Meredith 1935
Iowa	1923–27	15±½	67	163.6	64.4	53.3	117.5	Baldwin 1930
Iowa	1930–37	15±½	179	166.9	65.7	54.3	119.7	Meredith 1941a
Iowa	1948–51	15 to 16	32	171.1	67.4	61.6	135.8	Eppright 1954
Southern:								
Maryland	1937–40	15 to 16	688	164.8	64.9	54.4	120.0	Wolff 1941, 1942
Virginia	1944–47	15±½	12	168.4	66.3	54.8	120.8	Dean 1955
South Carolina	1940–42	15±½	8	162.6	64.0	41.8	92.1	Moser 1945
Tennessee	1932	15(±½)	49	162.0	63.8	51.5	113.5	Wheeler 1933
Alabama	1942–52	15 to 16	178	169.7	66.8	59.5	131.2	Dreizen 1953
Alabama	1947	15(±½)	5	161.8	63.7	47.1	103.8	Martin 1948
Louisiana	1948–49	15 to 16	5	158.8	62.5	48.5	106.9	Moschette n.p. (a)
Western:								
Montana	1951–52	15 to 16	72	170.4	67.1	59.6	131.3	Odland n.p.
Wyoming	1929–34	15±½	5	164.1	64.6	49.6	109.4	Follstad 1938
Idaho	1951	15 to 16	57	170.4	67.1	60.7	133.8	Warnick n.p.
Colorado	1934–41	15 to 16	19	170.3	67.0	53.0	116.8	Duval 1942
Colorado	1949–50	15 to 16	36	169.7	66.8	56.9	125.4	Dyar n.p.
New Mexico	1949–50	15 to 16	27	168.4	66.3	55.0	121.3	Lantz n.p.
Utah	(1931–35)	15±½	1,152	164.1	64.6	50.2	110.7	Brown 1936
Utah	1950–51	15 to 16	12	176.0	69.3	63.1	139.2	Wilcox n.p. (a)
Washington	1951–52	15 to 16	57	171.7	67.6	59.4	130.9	Esselbaugh n.p.
Oregon	1947–48	15 to 16	132	170.9	67.3	61.4	135.3	Storvick n.p.
Oregon	1950	15±¼	102	169.3	66.6	60.1	132.5	Newcomer 1951
California	1923	15.0	5	162.8	64.1	50.3	111.0	Baldwin 1925b
California	1925–30	15 to 16	994	167.4	65.9	56.3	124.2	Bissett 1932
California	1931–47	15.0	66	171.9	67.7	60.7	133.8	Tuddenham 1954
California	1936–38	15±½	4,938	166.4	65.5	55.4	122.1	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West	(1926–30)	15±½	362	168.5	66.3	56.0	123.5	Gray 1931
N. C. and West (5 States)	1937–39	15 to 16	4,702	167.8	66.1	56.0	123.4	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 14a.—*Standards used for 15-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood_____	Short_____	152	60	43.1	95	⎫
	Medium_____	165	65	54.4	120	⎬ Baldwin 1923
	Tall_____	178	70	65.3	144	⎭
Stuart-Meredith_____	10th percentile_____	157.8	62.1	45.1	99.4	⎫
	25th percentile_____	162.3	63.9	49.1	108.2	⎪
	50th percentile_____	167.8	66.1	54.5	120.1	⎬ Stuart 1946b
	75th percentile_____	173.0	68.1	61.2	135.0	⎪
	90th percentile_____	176.7	69.6	67.0	147.8	⎭

TABLE 15.—SIXTEEN-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine_____	1934–36	16±½	9	166.4	65.5	52.5	115.7	Clayton 1940
Maine_____	1948–51	16±½	65	168.4	66.3	58.2	128.2	Clayton n.p.
Massachusetts_____	1922–34	16±¼	684	168.3	66.3	58.4	128.6	Shuttleworth 1939
Massachusetts_____	1939–45	16 (to 17)	280	175.0	68.9	66.2	146	Gallagher 1953
Rhode Island_____	1948–51	16±½	28	172.2	67.8	63.3	139.6	Tucker n.p.
New York_____	(<1928)	16 to 17	90	169.9	66.9	57.3	126.3	Schwartz 1928
New York_____	1934–39	16 to 17	8	169.2	66.6	59.6	131.4	Webster 1941
New York_____	1948–51	16±½	5	169.2	66.6	63.5	140.0	Young n.p.
North Central:								
Ohio_____	1931–42	16.0	128	175.2	69.0	64.4	141.9	Simmons 1944
Illinois_____	(1930–36)	16.0	231	172.2	67.8	57.9	127.7	Richey 1937
Illinois_____	(<1935)	16 (to 17)	29	166.4	65.5	56.3	124.1	Dimock 1935
Michigan_____	1954	16±½	177	172.5	67.9	64.5	142.3	Martin 1955
Minnesota_____	1938–39	16±½	194	168.4	66.3	56.9	125.4	Matheny 1947
Iowa_____	1920–27	16±½	92	169.7	66.8	57.8	127.4	Meredith 1941a
Iowa_____	1920–34	16±½	343	169.7	66.8	58.4	128.7	Meredith 1935
Iowa_____	1923–27	16±½	49	166.6	65.6	56.0	123.4	Baldwin 1930
Iowa_____	1930–37	16±½	180	171.5	67.5	59.6	131.4	Meredith 1941a
Iowa_____	1948–51	16 to 17	34	170.4	67.1	63.6	140.2	Eppright 1954
Southern:								
Maryland_____	1937–40	16 to 17	339	169.1	66.6	60.3	133.0	Wolff 1941, 1942
Virginia_____	1944–47	16±½	6	167.1	65.8	54.7	120.6	Dean 1955
South Carolina_____	1940–42	16±½	7	162.9	64.1	49.3	108.6	Moser 1945
Tennessee_____	1932	16(±½)	28	164.8	64.9	54.4	119.9	Wheeler 1935
Western:								
Montana_____	1951–52	16 to 17	12	174.0	68.5	63.1	139.1	Odland n.p.
Idaho_____	1951	16 to 17	57	172.7	68.0	64.8	142.8	Warnick n.p.
Colorado_____	1949–50	16 to 17	15	173.0	68.1	60.1	132.5	Dyar n.p.
New Mexico_____	1949–50	16 to 17	25	172.5	67.9	59.1	130.4	Lantz n.p.
Utah_____	1950–51	16 to 17	10	172.2	67.8	63.7	140.5	Wilcox n.p.
Washington_____	1951–52	16 to 17	29	176.8	69.6	69.5	153.2	Esselbaugh n.p.
Oregon_____	1947–48	16 to 17	112	173.5	68.3	66.5	146.6	Storvick n.p.
California_____	1925–30	16 to 17	1,308	170.8	67.3	60.4	133.1	Bissett 1932
California_____	1931–47	16.0	66	175.8	69.2	65.9	145.3	Tuddenham 1954
California_____	1936–38	16±½	4,182	170.7	67.2	59.8	131.9	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West_____	(1926–30)	16±½	292	172.8	68.0	60.6	133.6	Gray 1931
N. C., and West (5 States)	1937–39	16 to 17	4,017	171.7	67.6	60.4	133.2	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 15a.—*Standards used for 16-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	Inches	Kilograms	Pounds	
Baldwin-Wood_____	Short_____	157	62	48.5	107	}Baldwin 1923
	Medium_____	170	67	60.8	134	
	Tall_____	183	72	70.3	155	
Stuart-Meredith_____	10th percentile_____	162.8	64.1	50.3	111.0	}Stuart 1946b
	25th percentile_____	167.1	65.8	53.8	118.7	
	50th percentile_____	171.6	67.6	58.8	129.7	
	75th percentile_____	176.6	69.5	65.5	144.4	
	90th percentile_____	179.7	70.7	71.4	157.3	

TABLE 16.—SEVENTEEN-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study[1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine_____	1948–51	17±½	11	172.2	67.8	58.9	129.8	Clayton n.p.
Massachusetts_____	1922–34	17±¼	587	171.3	67.5	62.1	136.9	Shuttleworth 1939
Massachusetts_____	1939–45	17 (to 18)	191	176.0	69.3	68.0	150	Gallagher 1953
Rhode Island_____	1948–51	17±½	14	177.3	69.8	68.7	151.4	Tucker n.p.
New York_____	(<1928)	17 to 18	54	172.7	68.0	59.4	131.0	Schwartz 1928
North Central:								
Ohio_____	1931–42	17.0	91	176.6	69.5	67.0	147.6	Simmons 1944
Illinois_____	(1930–36)	17.0	150	174.8	68.8	61.3	135.1	Richey 1937
Michigan_____	1954	17±½	169	175.3	69.0	68.7	151.4	Martin 1955
Minnesota_____	1938–39	17±½	196	172.4	67.9	62.4	137.6	Matheny 1947
Iowa_____	1920–27	17±½	86	172.9	68.1	61.3	135.1	Meredith 1941a
Iowa_____	1920–34	17±½	288	173.5	68.3	62.4	137.6	Meredith 1935
Iowa_____	1923–27	17±½	38	170.2	67.0	58.7	129.3	Baldwin 1930
Iowa_____	1930–37	17±½	157	173.4	68.3	62.6	138.0	Meredith 1941a
Iowa_____	1948–51	17 to 18	21	172.9	68.1	63.8	140.7	Eppright 1954
Southern:								
Maryland_____	1937–40	17 to 18	186	172.7	68.0	63.1	139.0	Wolff 1941, 1942
Tennessee_____	1932	17(±½)	21	171.7	67.6	60.6	133.6	Wheeler 1933
Western:								
Idaho_____	1951	17 to 18	12	172.2	67.8	64.1	141.3	Warnick n.p.
California_____	1925–30	17 to 18	1,148	173.0	68.1	62.8	138.4	Bissett 1932
California_____	1931–47	17.0	66	177.9	70.0	68.7	151.5	Tuddenham 1954
California_____	1936–38	17±½	3,198	173.0	68.1	62.6	138.1	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West_____	(1926–30)	17±½	229	175.2	69.0	64.3	141.8	Gray 1931
N. C. and West (5 States)	1937–39	17 to 18	2,771	173.8	68.4	63.1	139.2	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 16a.—*Standards used for 17-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	Inches	Kilograms	Pounds	
Baldwin-Wood_____	Short_____	163	64	54.9	121	}Baldwin 1923
	Medium_____	173	68	64.0	141	
	Tall_____	183	72	70.8	156	
Stuart-Meredith_____	10th percentile_____	165.5	65.2	53.3	117.5	}Stuart 1946b
	25th percentile_____	169.7	66.8	56.5	124.5	
	50th percentile_____	173.7	68.4	61.8	136.2	
	75th percentile_____	178.1	70.1	68.7	151.4	
	90th percentile_____	181.6	71.5	74.7	164.6	

TABLE 17.—EIGHTEEN-YEAR-OLD BOYS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Massachusetts_____	1922–34	18±¼	277	173.0	68.1	64.9	143.1	Shuttleworth 1939
New York_____	(<1928)	18 to 19	41	172.7	68.0	61.1	134.8	Schwartz 1928
North Central:								
Illinois_____	(1930–36)	18.0	49	177.0	69.7	63.2	139.3	Richey 1937
Michigan_____	1954	18±½	139	176.0	69.3	71.0	156.6	Martin 1955
Iowa_____	1920–34	18±½	216	174.2	68.6	64.7	142.6	Meredith 1935
Iowa_____	1923–27	18±½	18	171.3	67.4	63.7	140.4	Baldwin 1930
Iowa_____	1948–51	18 to 19	18	172.4	67.9	66.1	145.7	Eppright 1954
Southern:								
Maryland_____	1940	18 to 19	79	172.3	67.8	64.9	143.1	Wolff 1941, 1942
Western:								
California_____	1925–30	18 to 19	594	174.0	68.5	63.6	140.2	Bissett 1932
California_____	1931–47	18.0	66	179.0	70.5	70.2	154.8	Tuddenham 1954
California_____	1936–38	18±½	1,607	174.2	68.6	68.6	141.8	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West_____	(1926–30)	18±½	129	176.2	69.4	66.1	145.7	Gray 1931

[1] Dates in parentheses are estimated.

TABLE 17a.—*Standards used for 18-year-old boys*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood_____	Short_____	165	65	59.4	131	⎫ Baldwin 1923
	Medium_____	175	69	67.6	149	⎬
	Tall_____	185	73	74.4	164	⎭
Stuart-Meredith_____	10th percentile_____	166.3	65.5	54.4	120.0	⎫
	25th percentile_____	170.5	67.1	57.7	127.1	⎪
	50th percentile_____	174.5	68.7	63.1	139.0	⎬ Stuart 1946b
	75th percentile_____	178.9	70.4	70.6	155.7	⎪
	90th percentile_____	182.4	71.8	76.7	169.0	⎭

Table 18.—Two-year-old girls: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Massachusetts_____	(1930–42)	$2\pm\frac{1}{12}$	49	85.9	33.8	12.4	27.3	Vickers 1943
Connecticut-New York____	(1930–37)	$2\pm\frac{1}{12}$	108	*86.6	*34.1	12.4	27.4	Peatman 1938
New York_____	1920–23	2 to 3	15	87.9	34.6	12.6	27.8	Johnson 1925
New York_____	1924–29	$2\pm\frac{1}{2}$	22	*86.7	*34.1	12.4	27.3	Wallis 1931
New York_____	1925–27	$2\pm\frac{1}{2}$	11	*87.2	*34.3	12.1	26.7	Sawtell 1929
New York_____	(<1933)	$2\pm\frac{1}{6}$	40	84.1	33.1	11.7	25.8	Freeman 1933·
North Central:								
Ohio_____	1931–42	2.0	165	86.1	33.9	12.5	27.5	Simmons 1944
Illinois_____	(1930–39)	2 to 3	12	*90.8	*35.7	14.0	30.9	Blair 1940
Michigan_____	1922–29	2.0	27	86.9	34.2	12.7	28.0	Wilson 1930
Iowa_____	1920–35	$2\pm\frac{1}{2}$	71	86.9	34.2	12.3	27.2	Boynton 1936
Iowa_____	1923–27	$2\pm\frac{1}{2}$	44	84.6	33.3	115.7	25.5	Baldwin 1930
Southern:								
Alabama_____	1939–41	$2\pm\frac{1}{4}$	25	85.1	33.5	12.3	27.1	Wise 1942
Western:								
Colorado_____	1932–37	2 to 3	88	90.3	35.6	13.0	28.6	Maresh 1938
Colorado_____	1934–41	2 to 3	72	92.0	36.2	13.0	28.7	Duval 1942
California_____	1928–31	2.0	19	86.1	33.9	12.2	26.9	Bayley 1935
California_____	1931–47	2.0	70	87.3	34.4	12.8	28.2	Tuddenham 1954
General Regional:								
N. E., N. C., West_____	(1926–30)	$2\pm\frac{1}{2}$	21	85.4	33.6	12.5	27.6	Gray 1931

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

Table 18a.—*Standards used for 2-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Woodbury-Grandprey_____	10th percentile_____	78.7	31.0	9.7	21.4	Grandprey 1933
	Average_____	84.0	33.1	11.4	25.1	Woodbury 1921
	90th percentile_____	88.9	35.0	13.2	29.1	Grandprey 1933
Jackson-Kelly (Meredith data)_____	Mean −1SD_____	84.1	33.1	_____	_____	⎫
	Mean_____	87.1	34.3	_____	_____	⎪
	Mean +1SD_____	89.9	35.4	_____	_____	⎬ Jackson 1945
	16th percentile_____	_____	_____	11.3	24.9	⎪
	Median_____	_____	_____	12.4	27.3	⎪
	84th percentile_____	_____	_____	13.7	30.2	⎭

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	Number	Centi-meters	Inches	Kilo-grams	Pounds	
Northeast:								
Massachusetts	(1930–42)	3±¹⁄₁₂	79	94.6	37.2	14.5	32.1	Vickers 1943
Connecticut-New York	(1930–37)	3±¹⁄₁₂	82	*95.0	*37.4	14.4	31.8	Peatman 1938
New York	1920–23	3 to 4	23	96.5	38.0	15.2	33.5	Johnson 1925
New York	1924–29	3±½	25	96.2	37.9	14.7	32.4	Wallis 1931
New York	1925–29	3±½	14	*95.7	*37.7	14.7	32.4	Sawtell 1929
New York	(<1933)	3±⅙	50	94.8	37.3	14.3	31.5	Freeman 1933
New York	1940–55	3 to 4	10	100.5	39.6	16.5	36.4	Taylor n.p.
North Central:								
Ohio	1931–42	3.0	186	95.4	37.6	14.7	32.4	Simmons 1944
Illinois	(1930–39)	3 to 4	10	*105.7	*41.6	16.6	36.6	Blair 1940
Michigan	1922–29	3.0	49	94.2	37.1	14.2	31.4	Wilson 1930
Minnesota	(<1941)	3.0	18	*96.2	*37.9	14.3	31.5	Boyd 1941
Iowa	1920–35	3±½	90	95.6	37.6	14.5	31.9	Boynton 1936
Iowa	1923–27	3±½	34	92.1	36.3	13.6	30.0	Baldwin 1930
Southern:								
Virginia	1944–47	3±½	7	94.0	37.0	15.2	33.4	Dean 1955
Alabama	1939–41	3±¼	20	92.4	36.4	14.3	31.5	Wise 1942
Alabama	1942–52	3 to 4	36	97.0	38.2	15.1	33.3	Dreizen 1953
Texas	(1946–53)	3 to 4	12	99.0	39.0	16.3	35.9	Lamb 1954
Western:								
Colorado	1932–37	3 to 4	80	98.9	38.9	15.1	33.3	Maresh 1938
Colorado	1934–41	3 to 4	72	100.5	39.6	15.2	33.5	Duval 1942
California	1928–31	3.0	24	95.0	37.4	14.5	32.0	Bayley 1935
California	1931–47	3.0	70	95.4	37.6	15.0	33.1	Tuddenham 1954
General Regional:								
N. E., N. C., West	(1926–30)	3±½	23	95.9	37.8	15.1	33.3	Gray 1931

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 19a.—*Standards used for 3-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	Inches	Kilo-grams	Pounds	
Woodbury-Grandprey	10th percentile	86.4	34.0	11.5	25.3	Grandprey 1933
	Average	92.1	36.3	13.4	29.5	Woodbury 1921
	90th percentile	97.5	38.4	15.4	34.0	Grandprey 1933
Jackson-Kelly (Meredith data)	Mean −1SD	92.2	36.3			⎫
	Mean	95.2	37.5			⎪
	Mean +1SD	98.8	38.9			⎬ Jackson 1945
	16th percentile			13.3	29.3	⎪
	Median			14.6	32.2	⎪
	84th percentile			16.1	35.5	⎭

Origin of data—region and State	Date of study[1]	Age when measured	Cases	Height[2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Massachusetts	(1930–42)	4±1/12	90	101.0	39.8	16.7	36.8	Vickers 1943
Connecticut-New York	(1930–37)	4±1/12	74	103.1	40.6	16.6	36.7	Peatman 1938
New York	1921–23	4 to 5	27	104.6	41.2	17.0	37.4	Johnson 1925
New York	1924–29	4±1/2	41	102.7	40.4	17.3	38.1	Wallis 1931
New York	1925–27	4±1/2	24	103.6	40.8	17.1	37.7	Sawtell 1929
New York	(<1933)	4±1/6	31	104.3	41.1	17.2	37.9	Freeman 1933
New York	1948–51	4±1/2	16	103.1	40.6	16.8	37.1	Young n.p.
North Central:								
Ohio	1931–42	4.0	222	103.3	40.7	16.8	37.1	Simmons 1944
Illinois	(1930–39)	4 to 5	16	*110.4	*43.5	18.9	41.7	Blair 1940
Michigan	1922–29	4.0	74	102.1	40.2	16.2	35.8	Wilson 1930
Minnesota	(<1941)	4.0	23	*103.8	*40.9	16.4	36.2	Boyd 1941
Iowa	1920–35	4±1/2	145	102.5	40.3	16.6	36.7	Boynton 1936
Iowa	1923–27	4±1/2	42	99.4	39.1	15.4	33.9	Baldwin 1930
Southern:								
Virginia	1944–47	4±1/2	12	100.6	39.6	16.4	36.1	Dean 1955
Alabama	1939–41	4±1/4	24	99.9	39.3	15.7	34.6	Wise 1942
Alabama	1942–52	4 to 5	85	104.9	41.3	17.5	38.5	Dreizen 1953
Texas	(1946–53)	4 to 5	14	104.9	41.3	17.4	38.4	Lamb 1954
Western:								
Colorado	1932–37	4 to 5	44	106.1	41.8	17.0	37.5	Maresh 1938
Colorado	1934–41	4 to 5	81	107.4	42.3	17.3	38.1	Duval 1942
California	1931–47	4.0	70	103.0	40.6	17.3	38.1	Tuddenham 1954
Regional General:								
N. E., N. C., West	(1926–30)	4±1/2	34	103.5	40.7	17.4	38.4	Gray 1931
U. S. (16 States and D. C.)	1937–39	4 to 5	1,007	104.4	41.1	17.0	37.5	O'Brien 1941

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 20a.—*Standards used for 4-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Woodbury-Grandprey	10th percentile	93.0	36.6	12.9	28.4	Grandprey 1933
	Average	98.8	38.9	15.0	33.1	Woodbury 1921
	90th percentile	104.9	41.3	17.4	38.4	Grandprey 1933
Jackson-Kelly (Meredith data)	Mean −1SD	98.8	38.9			
	Mean	102.4	40.3			
	Mean +1SD	106.2	41.8			Jackson 1945
	16th percentile			15.3	33.7	
	Median			16.8	37.0	
	84th percentile			18.7	41.3	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	5±½	33	109.2	43.0	18.6	40.9	Clayton 1940
Maine	1936–40	5±½	49	108.2	42.6	18.5	40.7	Clayton 1944
Massachusetts	1922–34	5.5±¼	34	107.3	42.2	18.8	41.4	Shuttleworth 1939
Massachusetts	(1930–42)	5±¹⁄₁₂	88	108.0	42.5	18.8	41.3	Vickers 1943
Connecticut-New York	(1930–37)	5±¹⁄₁₂	61	110.2	43.4	18.8	41.4	Peatman 1938
New York	1920–23	5 to 6	36	111.3	43.8	19.3	42.5	Johnson 1925
New York	1924–29	5±½	48	109.7	43.2	18.9	41.7	Wallis 1931
New York	1925–27	5±½	24	*110.6	*43.5	18.9	41.7	Sawtell 1929
New York	(<1933)	5±⅙	35	112.4	44.3	19.3	42.5	Freeman 1933
New York	1948–51	5±½	17	109.7	43.2	19.1	42.0	Young n.p.
North Central:								
Ohio	1931–42	5.0	225	110.6	43.5	19.1	42.2	Simmons 1944
Illinois	(1930–39)	5 to 6	13	*113.9	*44.8	21.8	48.1	Blair 1940
Michigan	1922–29	5.0	36	108.0	42.5	18.0	39.6	Wilson 1930
Michigan	1954	5±½	12	109.7	43.2	18.6	41.1	Martin 1955
Minnesota	1932–33	5(±½)	100	116.6	45.9	20.0	44.0	Weisman 1935
Minnesota	(<1941)	5.0	19	*110.7	*43.6	18.3	40.3	Boyd 1941
Iowa	1920–27	5±½	87	108.0	42.5	17.6	38.8	Meredith 1941a
Iowa	1920–35	5±½	196	108.9	42.9	18.2	40.1	Boynton 1936
Iowa	1923–27	5±½	55	107.2	42.2	17.8	39.3	Baldwin 1930
Iowa	1930–37	5±½	129	109.8	43.2	18.8	41.4	Meredith 1941a
Southern:								
Virginia	1944–47	5±½	18	107.4	42.3	18.4	40.6	Dean 1955
Alabama	1939–41	5±¼	23	105.6	41.6	17.7	39.0	Wise 1942
Alabama	1942–52	5 to 6	65	111.3	43.8	19.4	42.8	Dreizen 1953
Texas	(1946–53)	5 to 6	5	110.0	43.3	19.0	41.9	Lamb 1954
Western:								
Wyoming	1929–34	5±½	8	110.0	43.3	18.1	39.8	Follstad 1938
Colorado	1932–38	5 to 6	19	113.6	44.7	19.0	41.8	Maresh 1938
Colorado	1934–41	5 to 6	80	114.4	45.0	19.6	43.2	Duval 1942
California	1931–47	5.0	70	110.3	43.4	19.6	43.2	Tuddenham 1954
General Regional:								
N. E., N. C., West	(1926–30)	5±½	51	111.1	43.7	19.5	43.0	Gray 1931
U. S. (16 States and D. C.)	1937–39	5 to 6	2,596	110.9	43.7	19.0	41.8	O'Brien 1941

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 21a.—*Standards used for 5-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	Inches	Kilograms	Pounds	
Woodbury-Grandprey	10th percentile	98.8	38.9	14.3	31.6	Grandprey 1933
	Average	105.0	41.3	16.6	36.6	Woodbury 1921
	90th percentile	111.5	43.9	19.1	42.0	Grandprey 1933
Stuart-Meredith	10th percentile	105.0	41.3	16.4	36.1	
	25th percentile	107.2	42.2	17.5	38.6	
	50th percentile	109.7	43.2	18.8	41.4	Stuart 1946b
	75th percentile	112.9	44.4	20.0	44.2	
	90th percentile	115.4	45.4	21.9	48.2	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	6±½	89	113.3	44.6	19.9	43.9	Clayton 1940
Maine	1936–40	6±½	106	113.0	44.5	19.1	42.2	Clayton 1944
Massachusetts	1922–34	6±¼	181	110.4	43.5	19.0	42.0	Shuttleworth 1939
Massachusetts	(1930–42)	6±½₂	68	113.9	44.8	20.5	45.1	Vickers 1943
Massachusetts	1935–40	6±½	9	117.5	46.3	21.3	46.9	Miller 1943
New York	1920–23	6 to 7	30	117.5	46.3	21.2	46.8	Johnson 1925
New York	1924–29	6±½	39	115.6	45.5	21.1	46.5	Wallis 1931
New York	1925–27	6±½	21	*115.9	*45.6	21.0	46.3	Sawtell 1929
New York	(<1933)	6±⅙	53	117.5	46.3	21.2	46.7	Freeman 1933
New York	1948–51	6±½	16	114.8	45.2	22.3	49.2	Young n.p.
Pennsylvania	1925–27	6 to 7	1,005	114.8	45.2	20.5	45.3	Hundley 1955
Pennsylvania	1932–34	6 to 7	825	115.1	45.3	20.9	46.1	Hundley 1955
Pennsylvania	1937–39	6 to 7	361	115.8	45.6	21.0	46.2	O'Brien 1941
Pennsylvania	1947–49	6 to 7	1,101	116.1	45.7	21.5	47.4	Hundley 1955
North Central:								
Ohio	1931–42	6.0	239	117.6	46.3	21.9	48.3	Simmons 1944
Ohio	1937–39	6 to 7	211	116.8	46.0	21.0	46.4	O'Brien 1941
Illinois	(1923–37)	6(±½)	45	112.5	44.3	19.1	42.1	Hardy 1938
Illinois	(1930–36)	6.0	31	116.8	46.0	21.4	47.2	Richey 1937
Illinois	(1930–39)	6 to 7	7	*115.2	*45.4	22.2	48.9	Blair 1940
Illinois	1937–39	6 to 7	196	118.7	46.7	22.5	49.6	O'Brien 1941
Michigan	(<1936)	6±½	137	116.8	46.0	20.0	44.2	Steggerda 1936
Michigan	1937–39	6 to 7	80	116.7	45.9	21.5	47.4	O'Brien 1941
Michigan	1954	6±½	91	114.8	45.2	21.2	46.8	Martin 1955
Minnesota	1932–33	6(±½)	202	118.9	46.8	21.2	46.8	Weisman 1935
Minnesota	1937–39	6 to 7	594	116.1	45.7	20.6	45.5	O'Brien 1941
Minnesota	(<1941)	6.0	8	*117.2	*46.1	20.1	44.3	Boyd 1941
Iowa	1920–27	6±½	103	113.9	44.8	19.8	43.7	Meredith 1941a
Iowa	1920–35	6±½	184	115.0	45.3	20.6	45.4	Boynton 1936
Iowa	1923–27	6±½	40	113.9	44.8	20.5	45.3	Baldwin 1930
Iowa	1930–37	6±½	123	116.0	45.7	21.0	46.3	Meredith 1941a
Iowa	1937–39	6 to 7	445	116.3	45.8	20.9	46.1	O'Brien 1941
Iowa	1948–51	6 to 7	50	117.8	46.4	22.0	48.4	Eppright 1954
Nebraska	1937–39	6 to 7	211	116.7	45.9	20.8	45.9	O'Brien 1941
Kansas	1937–39	6 to 7	305	116.5	45.9	20.8	45.8	O'Brien 1941
Southern:								
Maryland	1937–40	6 to 7	591	116.4	45.8	20.9	46.1	Wolff 1941, 1942
Maryland	1947	6(±½)	57	116.6	45.9	21.0	46.2	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	6 to 7	436	117.3	46.2	21.6	47.6	O'Brien 1941
Virginia	1944–47	6±½	23	113.5	44.7	19.7	43.5	Dean 1955
South Carolina	1940–42	6±½	27	113.4	44.6	20.0	44.1	Moser 1945
Tennessee	1932	6(±½)	20	112.9	44.4	19.2	42.3	Wheeler 1933
Tennessee	1937–39	6 to 7	262	116.4	45.8	20.8	45.9	O'Brien 1941
Alabama	1937–39	6 to 7	340	116.8	46.0	20.8	45.9	O'Brien 1941
Alabama	1942–52	6 to 7	126	117.6	46.3	21.9	48.3	Dreizen 1953
Alabama	1947	6(±½)	49	119.4	47.0	19.6	43.1	Martin 1948
Texas	1937–39	6 to 7	346	117.4	46.2	21.4	47.2	O'Brien 1941
Western:								
Wyoming	1929–34	6±½	26	114.8	45.2	19.8	43.7	Follstad 1938
Colorado	1934–41	6 to 7	81	120.7	47.5	21.9	48.3	Duval 1942
Colorado	1937–39	6 to 7	295	116.1	45.7	20.3	44.8	O'Brien 1941
Utah	(1931–35)	6±½	676	115.3	45.4	20.2	44.6	Brown 1936
Utah	1937–39	6 to 7	232	117.9	46.4	20.8	45.8	O'Brien 1941
Utah	1950–51	6 to 7	7	116.1	45.7	18.6	41.0	Wilcox n.p. (a)
Utah	1954–55	6 to 7	5	119.4	47.0	20.1	44.4	Wilcox n.p. (b)
California	1931–47	6.0	70	117.2	46.1	22.1	48.7	Tuddenham 1954
California	1936–38	6±½	3,502	116.1	45.7	21.1	46.6	Lloyd-Jones 1940, 1941
California	1937–39	6 to 7	245	118.3	46.6	22.4	49.4	O'Brien 1941

See footnotes at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height [2]		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
General Regional:								
Northeast	1922–24	6±½	348	113.8	44.8	21.0	46.4	}Palmer 1935
North Central	1922–24	6±½	375	113.5	44.7	20.0	44.1	
South (Central)	1922–24	6±½	193	113.8	44.8	20.0	44.0	
West (Mountain)	1922–24	6±½	50	114.3	45.0	19.7	43.5	
N. E., N. C., West	(1926–30)	6±½	74	118.1	46.5	22.4	49.4	Gray 1931
U. S. (16 States and D. C.)	1937–39	6 to 7	4,559	116.8	46.0	21.1	46.5	O'Brien 1941

[1] Dates in parentheses are estimated.
[2] Asterisk (*) indicates recumbent length.

TABLE 22a.—*Standards used for 6-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	Inches	Kilograms	Pounds	
Baldwin-Wood	Short	109	43	18.6	41	}Baldwin 1923
	Medium	114	45	20.4	45	
	Tall	119	47	22.7	50	
Stuart-Meredith	10th percentile	110.6	43.5	18.1	39.9	}Stuart 1946b
	25th percentile	113.2	44.6	19.5	42.9	
	50th percentile	115.9	45.6	21.1	46.5	
	75th percentile	119.3	47.0	22.8	50.2	
	90th percentile	122.3	48.1	24.6	54.2	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	7±½	99	117.9	46.4	21.4	47.1	Clayton 1940
Maine	1936–40	7±½	110	118.9	46.8	21.3	46.9	Clayton 1944
Massachusetts	1922–31	7 to 8	275	119.1	46.9	22.7	50.0	Wilson 1935
Massachusetts	1922–34	7±¼	471	116.3	45.8	21.5	47.4	Shuttleworth 1939
Massachusetts	(1930–42)	7±1⁄12	61	119.5	47.0	22.8	50.2	Vickers 1943
Massachusetts	1935–40	7±½	24	123.4	48.6	24.4	53.8	Miller 1943
Connecticut	1934–36	7 to 7½	348	119.6	47.1	23.2	51.2	Jenss 1940
New York	1920–23	7 to 8	28	123.4	48.6	23.8	52.4	Johnson 1925
New York	1924–29	7±½	23	122.1	48.1	23.9	52.7	Wallis 1931
New York	1925–27	7±½	15	122.6	48.3	23.5	51.8	Sawtell 1929
New York	(<1933)	7±1⁄6	39	124.2	48.9	24.1	53.1	Freeman 1933
New York	1948–51	7±½	16	121.7	47.9	23.9	52.6	Young n.p.
Pennsylvania	1937–39	7 to 8	438	121.2	47.7	23.3	51.4	O'Brien 1941
North Central:								
Ohio	1931–42	7.0	235	123.8	48.7	24.7	54.5	Simmons 1944
Ohio	1937–39	7 to 8	250	121.3	47.8	22.9	50.5	O'Brien 1941
Illinois	(1923–37)	7(±½)	114	117.3	46.2	20.4	45.0	Hardy 1938
Illinois	(1930–36)	7.0	58	121.9	48.0	23.7	52.3	Richey 1937
Illinois	1937–39	7 to 8	260	123.6	48.7	24.4	53.8	O'Brien 1941
Michigan	(<1936)	7±½	188	122.4	48.2	22.5	49.5	Steggerda 1936
Michigan	1937–39	7 to 8	100	122.8	48.3	23.8	52.5	O'Brien 1941
Michigan	1954	7±½	86	120.6	47.5	23.3	51.3	Martin 1955
Minnesota	1932–33	7(±½)	250	124.7	49.1	23.6	52.0	Weisman 1935
Minnesota	1937–39	7 to 8	560	122.1	48.1	23.5	51.8	O'Brien 1941
Iowa	1920–27	7±½	107	121.0	47.6	22.7	50.0	Meredith 1941a
Iowa	1920–35	7±½	219	120.9	47.6	22.9	50.5	Boynton 1936
Iowa	1923–27	7±½	62	121.9	48.0	23.7	52.3	Baldwin 1930
Iowa	1930–37	7±½	110	122.4	48.2	23.7	52.2	Meredith 1941a
Iowa	1937–39	7 to 8	535	121.9	48.0	23.4	51.6	O'Brien 1941
Iowa	1948–51	7 to 8	48	122.6	48.3	24.8	54.7	Eppright 1954
Nebraska	1937–39	7 to 8	210	121.9	48.0	22.8	50.3	O'Brien 1941
Kansas	1937–39	7 to 8	364	122.5	48.2	23.5	51.7	O'Brien 1941
Southern:								
Maryland	1937–40	7 to 8	901	121.0	47.6	22.6	49.8	Wolff 1941, 1942
Maryland	1947	7(±½)	67	121.7	47.9	23.0	50.7	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	7 to 8	522	122.6	48.3	23.7	52.3	O'Brien 1941
Virginia	1918–30	7±½	16	119.6	47.1			Bean 1931
Virginia	1944–47	7±½	22	119.9	47.2	22.3	49.2	Dean 1955
South Carolina	1940–42	7±½	33	119.6	47.1	21.8	48.1	Moser 1945
Tennessee	1932	7(±½)	48	118.6	46.7	21.8	48.1	Wheeler 1933
Tennessee	1937–39	7 to 8	398	121.2	47.7	22.6	49.8	O'Brien 1941
Alabama	1937–39	7 to 8	450	121.2	47.7	22.7	50.0	O'Brien 1941
Alabama	1942–52	7 to 8	114	121.9	48.0	24.0	52.9	Dreizen 1953
Alabama	1947	7(±½)	27	121.9	48.0	22.5	49.5	Martin 1948
Texas	1929–31	7±½	127	119.9	47.2	22.3	49.2	Whitacre 1939
Texas	1937–39	7 to 8	472	122.4	48.2	23.4	51.6	O'Brien 1941
Western:								
Wyoming	1929–34	7±½	46	119.9	47.2	21.5	47.4	Follstad 1938
Colorado	1934–41	7 to 8	69	127.6	50.2	24.9	54.9	Duval 1942
Colorado	1937–39	7 to 8	320	122.0	48.0	22.7	50.0	O'Brien 1941
Utah	(1931–35)	7±½	1,271	119.9	47.2	21.6	47.7	Brown 1936
Utah	1937–39	7 to 8	274	124.0	48.8	23.5	51.8	O'Brien 1941
Utah	1950–51	7 to 8	8	121.9	48.0	22.2	48.9	Wilcox n.p. (a)
Utah	1954–55	7 to 8	81	127.0	50.0	24.0	52.8	Wilcox n.p. (b)
Oregon	1951–52	7±1⁄6	168	121.4	47.8	23.7	52.2	Meredith 1953
California	1923	7.0	13	120.7	47.5	23.8	52.5	Baldwin 1925b
California	1931–47	7.0	70	123.4	48.6	24.8	54.7	Tuddenham 1954
California	1936–38	7±½	3,913	121.9	48.0	23.5	51.7	Lloyd-Jones 1940, 1941
California	1937–39	7 to 8	264	123.9	48.8	24.9	54.9	O'Brien 1941

See footnote at end of table.

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi- meters*	*Inches*	*Kilo- grams*	*Pounds*	
General Regional:								
Northeast_____	1922–24	7±½	524	118.4	46.6	22.5	49.6	⎫
North Central_____	1922–24	7±½	480	118.9	46.8	22.2	48.9	⎬Palmer 1935
South (Central)_____	1922–24	7±½	418	118.1	46.5	21.4	47.2	⎟
West (Mountain)_____	1922–24	7±½	126	118.9	46.8	21.4	47.1	⎭
N. E., N. C., West_____	(1926–30)	7±½	90	124.1	48.9	25.1	55.3	Gray 1931
U. S. (16 States and D. C.)	1937–39	7 to 8	5,367	122.2	48.1	23.4	51.5	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 23a.—*Standards used for 7-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centi- meters	*Inches*	*Kilo- grams*	*Pounds*	
Baldwin-Wood_____	Short_____	114	45	20.4	45	⎫
	Medium_____	119	47	22.7	50	⎬Baldwin 1923
	Tall_____	127	50	25.4	56	⎭
Stuart-Meredith_____	10th percentile_____	116.8	46.0	20.2	44.5	⎫
	25th percentile_____	119.2	46.9	21.8	48.1	⎟
	50th percentile_____	122.3	48.1	23.7	52.2	⎬Stuart 1946b
	75th percentile_____	125.9	49.6	25.5	56.3	⎟
	90th percentile_____	128.9	50.7	27.8	61.2	⎭

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	8±½	124	122.7	48.3	23.5	51.9	Clayton 1940
Maine	1936–40	8±½	104	124.2	48.9	23.2	51.2	Clayton 1944
Massachusetts	1922–31	8 to 9	275	124.6	49.1	25.2	55.6	Wilson 1935
Massachusetts	1922–34	8±¼	604	122.0	48.0	24.0	52.9	Shuttleworth 1939
Massachusetts	(1930–42)	8±¹⁄₁₂	47	124.9	49.2	25.4	55.9	Vickers 1942
Massachusetts	1935–40	8±½	24	129.2	50.9	27.2	60.0	Miller 1943
New York	1920–23	8 to 9	17	128.8	50.7	26.0	57.3	Johnson 1925
New York	1924–29	8±½	15	128.1	50.4	26.8	59.1	Wallis 1931
New York	1925–27	8±½	5	132.5	52.2	27.9	61.5	Sawtell 1929
New York	(<1933)	8±⅙	35	129.3	50.9	26.8	59.1	Freeman 1933
New York	1940–55	8 to 9	14	133.1	52.4	31.1	68.3	Taylor n.p.
New York	1948–51	8±½	12	126.5	49.8	25.7	56.7	Young n.p.
Pennsylvania	1937–39	8 to 9	374	126.6	49.8	25.9	57.2	O'Brien 1941
North Central:								
Ohio	1931–42	8.0	218	129.8	51.1	28.1	61.9	Simmons 1944
Ohio	1937–39	8 to 9	300	126.8	49.9	25.3	55.8	O'Brien 1941
Illinois	(1923–37)	8(±½)	146	122.4	48.2	22.7	50.0	Hardy 1938
Illinois	(1930–36)	8.0	72	128.0	50.4	26.4	58.2	Richey 1937
Illinois	1937–39	8 to 9	305	128.3	50.5	26.8	59.1	O'Brien 1941
Michigan	(<1936)	8±½	204	128.0	50.4	24.9	54.8	Steggerda 1936
Michigan	1937–39	8 to 9	159	127.9	50.4	27.1	59.7	O'Brien 1941
Michigan	1954	8±½	88	127.8	50.3	27.5	60.7	Martin 1955
Minnesota	1932–33	8(±½)	307	127.3	50.1	26.0	57.4	Weisman 1935
Minnesota	1937–39	8 to 9	594	128.4	50.6	26.2	57.8	O'Brien 1941
Iowa	1920–27	8±½	97	126.0	49.6	24.9	54.9	Meredith 1941a
Iowa	1920–35	8±½	193	126.7	49.9	25.6	56.4	Boynton 1936
Iowa	1923–27	8±½	65	125.2	49.3	25.4	55.9	Baldwin 1930
Iowa	1930–37	8±½	101	128.4	50.6	26.9	59.3	Meredith 1941a
Iowa	1937–39	8 to 9	492	127.8	50.3	26.3	57.9	O'Brien 1941
Iowa	1948–51	8 to 9	44	126.7	49.9	26.3	57.9	Eppright 1954
Nebraska	1937–39	8 to 9	238	127.8	50.3	25.6	56.4	O'Brien 1941
Kansas	1937–39	8 to 9	364	127.9	50.4	25.9	57.0	O'Brien 1941
Kansas	1948–51	8 to 9	11	131.2	51.7	28.0	61.7	Marlatt n.p.
Southern:								
Maryland	1937–40	8 to 9	927	126.4	49.8	25.1	55.4	Wolff 1941, 1942
Maryland	1947	8(±½)	81	127.3	50.1	26.4	58.1	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	8 to 9	561	127.9	50.4	26.4	58.1	O'Brien 1941
Virginia	1918–30	8±½	23	125.5	49.4	----	----	Bean 1931
Virginia	1944–47	8±½	19	124.5	49.0	24.6	54.2	Dean 1955
Virginia	1951–52	8±½	12	126.2	49.7	23.4	51.5	Dean n.p.
South Carolina	1940–42	8±½	59	126.2	49.7	24.4	53.9	Moser 1945
Tennessee	1932	8(±½)	77	124.8	49.1	24.6	54.2	Wheeler 1933
Tennessee	1937–39	8 to 9	357	126.6	49.8	25.2	55.5	O'Brien 1941
Alabama	1937–39	8 to 9	487	126.8	49.9	24.8	54.7	O'Brien 1941
Alabama	1942–52	8 to 9	144	129.0	50.8	27.9	61.4	Dreizen 1953
Alabama	1947	8(±½)	45	125.0	49.2	24.4	53.7	Martin 1948
Louisiana	1950–51	8±½	52	125.6	49.4	25.2	55.5	Moschette n.p. (b)
Texas	1929–31	8±½	221	125.0	49.2	24.3	53.5	Whitacre 1939
Texas	1937–39	8 to 9	518	128.1	50.4	25.9	57.0	O'Brien 1941
Western:								
Wyoming	1929–34	8±½	65	126.5	49.8	24.1	53.1	Follstad 1938
Colorado	1934–41	8 to 9	65	133.0	52.4	28.5	62.8	Duval 1942
Colorado	1937–39	8 to 9	396	127.4	50.2	25.2	55.5	O'Brien 1941
Utah	(1931–35)	8±½	1,365	125.0	49.2	24.0	53.0	Brown 1936
Utah	(1937)	8±½	11	121.4	47.8	23.1	51.0	Brown 1942
Utah	1937–39	8 to 9	348	127.9	50.4	25.1	55.4	O'Brien 1941
Utah	1950–51	8 to 9	10	130.6	51.4	27.2	60.0	Wilcox n.p. (a)
Utah	1954–55	8 to 9	132	129.5	51.0	27.0	59.6	Wilcox n.p. (b)
California	1923	8.0	15	127.0	50.0	27.3	60.2	Baldwin 1925b
California	1931–47	8.0	70	129.2	50.9	28.0	61.7	Tuddenham 1954
California	1936–38	8±½	4,304	127.5	50.2	26.2	57.8	Lloyd-Jones 1940, 1941
California	1937–39	8 to 9	261	129.8	51.1	27.9	61.6	O'Brien 1941

See footnote at end of table.

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi-meters*	*Inches*	*Kilo-grams*	*Pounds*	
General Regional:								
Northeast	1922–24	8±½	513	125.0	49.2	24.9	54.8	}Palmer 1935
North Central	1922–24	8±½	478	124.2	48.9	24.3	53.5	
South (Central)	1922–24	8±½	508	123.4	48.6	23.9	52.6	
West (Mountain)	1922–24	8±½	153	124.5	49.0	23.3	51.3	
N. E., N. C., West	(1926–30)	8±½	100	130.7	51.5	27.9	61.5	Gray 1931
U. S. (16 States and D. C.)	1937–39	8 to 9	5,754	127.7	50.3	25.9	57.1	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 24a.—*Standards used for 8-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	*Inches*	*Kilo-grams*	*Pounds*	
Baldwin-Wood	Short	119	47	22.7	50	}Baldwin 1923
	Medium	127	50	25.9	57	
	Tall	135	53	30.4	67	
Stuart-Meredith	10th percentile	122.1	48.1	22.0	48.6	}Stuart 1946b
	25th percentile	124.8	49.1	24.1	53.1	
	50th percentile	128.0	50.4	26.4	58.1	
	75th percentile	131.6	51.8	28.7	63.3	
	90th percentile	134.6	53.0	31.7	69.9	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi-meters*	*Inches*	*Kilo-grams*	*Pounds*	
Northeast:								
Maine	1934–36	9±½	99	129.3	50.9	26.9	59.2	Clayton 1940
Maine	1936–40	9±½	122	129.8	51.1	26.1	57.6	Clayton 1944
Massachusetts	1922–31	9 to 10	275	129.9	51.1	28.0	61.7	Wilson 1935
Massachusetts	1922–34	9±¼	704	127.4	50.1	26.7	58.8	Shuttleworth 1939
Massachusetts	(1930–42)	9±1/12	34	130.9	51.5	27.7	61.1	Viekers 1943
Massachusetts	1935–40	9±½	20	135.1	53.2	30.7	67.7	Miller 1943
New York	1920–23	9 to 10	10	135.1	53.2	28.6	63.1	Johnson 1925
New York	(<1933)	9±⅙	27	133.2	52.4	29.1	64.2	Freeman 1933
New York	1940–55	9 to 10	44	135.6	53.4	32.4	71.2	Taylor n.p.
New York	1948–51	9±½	24	132.1	52.0	29.3	64.5	Young n.p.
Pennsylvania	1937–39	9 to 10	477	131.5	51.8	28.4	62.5	O'Brien 1941
North Central:								
Ohio	1931–42	9.0	215	135.3	53.3	31.6	69.6	Simmons 1944
Ohio	1937–39	9 to 10	328	132.0	52.0	28.4	62.5	O'Brien 1941
Ohio	1948–51	9 to 10	89	135.6	53.4	30.9	68.1	Patton n.p.
Illinois	(1923–37)	9(±½)	167	128.0	50.4	25.7	56.7	Hardy 1938
Illinois	(1930–36)	9.0	95	133.1	52.4	29.8	65.6	Richey 1937
Illinois	1937–39	9 to 10	334	132.3	52.1	29.3	64.6	O'Brien 1941
Michigan	(<1936)	9±½	180	132.3	52.1	27.8	61.2	Steggerda 1936
Michigan	1937–39	9 to 10	176	132.8	52.3	29.0	63.9	O'Brien 1941
Michigan	1954	9±½	96	132.1	52.0	30.1	66.4	Martin 1955
Minnesota	1932–33	9(±½)	296	135.4	53.3	28.9	63.8	Weisman 1935
Minnesota	1937–39	9 to 10	699	133.2	52.4	28.9	63.8	O'Brien 1941
Iowa	1920–27	9±½	97	131.5	51.8	27.6	60.8	Meredith 1941a
Iowa	1920–35	9±½	204	132.5	52.2	28.5	62.8	Boynton 1936
Iowa	1923–27	9±½	75	128.8	50.7	27.0	59.5	Baldwin 1930
Iowa	1930–37	9±½	105	133.9	52.7	29.5	65.0	Meredith 1941a
Iowa	1937–39	9 to 10	539	132.7	52.2	28.9	63.7	O'Brien 1941
Iowa	1948–51	9 to 10	64	133.4	52.5	30.7	67.7	Eppright 1954
Nebraska	1937–39	9 to 10	267	133.3	52.5	28.6	63.0	O'Brien 1941
Kansas	1937–39	9 to 10	412	132.6	52.2	28.6	63.0	O'Brien 1941
Kansas	1948–51	9 to 10	111	134.8	53.1	30.3	66.8	Marlatt n.p.
Southern:								
Maryland	1937–40	9 to 10	988	131.7	51.9	27.8	61.3	Wolff 1941, 1942
Maryland	1947	9(±½)	82	133.1	52.4	28.4	62.5	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	9 to 10	556	133.0	52.4	29.0	63.9	O'Brien 1941
Virginia	1918–30	9±½	16	130.1	51.2			Bean 1931
Virginia	1944–47	9±½	10	129.3	50.9	25.1	55.4	Dean 1955
Virginia	1951–52	9±½	18	134.9	53.1	29.3	64.6	Dean n.p.
South Carolina	1940–42	9±½	57	129.3	50.9	26.3	57.9	Moser 1945
Tennessee	1932	9(±½)	78	129.3	50.9	26.8	59.1	Wheeler 1933
Tennessee	1937–39	9 to 10	396	131.8	51.9	27.5	60.7	O'Brien 1941
Alabama	1937–39	9 to 10	541	131.8	51.9	27.4	60.5	O'Brien 1941
Alabama	1942–52	9 to 10	101	134.4	52.9	30.7	67.7	Dreizen 1953
Alabama	1947	9(±½)	49	132.1	52.0	27.0	59.5	Martin 1948
Louisiana	1948–49	9±½	33	135.6	53.4	29.5	65.0	Moschette n.p. (a)
Louisiana	1950–52	9±½	60	131.1	51.6	27.9	61.4	Moschette n.p. (b)
Texas	1929–31	9±½	248	130.0	51.2	27.1	59.7	Whitacre 1939
Texas	1937–39	9 to 10	435	132.7	52.2	28.6	63.1	O'Brien 1941
Western:								
Wyoming	1929–34	9±½	91	131.3	51.7	26.6	58.6	Follstad 1938
Colorado	1934–41	9 to 10	49	139.0	54.7	32.1	70.8	Duval 1942
Colorado	1937–39	9 to 10	392	132.9	52.3	27.9	61.6	O'Brien 1941
Utah	(1931–35)	9±½	1,439	131.1	51.6	26.8	59.0	Brown 1936
Utah	(1937)	9±½	30	128.8	50.7	25.8	56.8	Brown 1942
Utah	1937–39	9 to 10	351	133.2	52.4	28.1	61.9	O'Brien 1941
Utah	1950–51	9 to 10	8	136.9	53.9	29.4	64.9	Wileox n.p. (a)
Utah	1954–55	9 to 10	113	134.1	52.8	30.0	66.1	Wilcox n.p. (b)
Oregon	1951–52	9±⅙	160	132.7	52.2	29.8	65.7	Meredith 1953
California	1923	9.0	23	132.8	52.3	29.9	65.9	Baldwin 1925b
California	1931–47	9.0	70	135.2	53.2	31.6	69.7	Tuddenham 1954
California	1936–38	9±½	4,612	132.3	52.1	29.1	64.1	Lloyd-Jones 1940, 1941
California	1937–39	9 to 10	271	135.2	53.2	31.6	69.6	O'Brien 1941

See footnote at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
General Regional:								
Northeast	1922–24	9±½	551	129.8	51.1	28.0	61.8	} Palmer 1935
North Central	1922–24	9±½	495	129.5	51.0	27.1	59.8	
South (Central)	1922–24	9±½	593	128.8	50.7	26.4	58.1	
West (Mountain)	1922–24	9±½	141	129.8	51.1	25.8	56.8	
N. E., N. C., West	(1926–30)	9±½	122	135.9	53.5	31.8	70.1	Gray 1931
U. S. (16 States and D. C.)	1937–39	9 to 10	6,174	132.7	52.2	28.6	63.1	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 25a.—*Standards used for 9-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	Inches	Kilograms	Pounds	
Baldwin-Wood	Short	124	49	24.9	55	} Baldwin 1923
	Medium	132	52	29.0	64	
	Tall	140	55	33.6	74	
Stuart-Meredith	10th percentile	127.0	50.0	23.9	52.6	} Stuart 1946b
	25th percentile	129.7	51.1	26.3	57.9	
	50th percentile	132.9	52.3	28.9	63.8	
	75th percentile	137.1	54.0	32.0	70.5	
	90th percentile	140.4	55.3	35.9	79.1	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi-meters	Inches	Kilo-grams	Pounds	
Northeast:								
Maine	1934–36	10±½	91	135.9	53.5	30.4	67.1	Clayton 1940
Maine	1936–40	10±½	103	135.6	53.4	28.8	63.4	Clayton 1944
Massachusetts	1922–31	10 to 11	275	135.3	53.3	31.2	68.8	Wilson 1935
Massachusetts	1922–34	10±¼	740	132.8	52.3	29.7	65.4	Shuttleworth 1939
Massachusetts	(1930–42)	10±¹⁄₁₂	24	136.5	53.7	32.0	70.4	Vickers 1943
Massachusetts	1931–33	10 to 11	5	146.4	57.6	38.8	85.5	Talbot 1937
Massachusetts	1935–40	10±½	15	139.3	54.8	33.6	74.0	Miller 1943
New York	1920–23	10 to 11	6	141.2	55.6	33.4	73.7	Johnson 1925
New York	(<1933)	10±⅙	19	139.8	55.0	33.7	74.3	Freeman 1933
New York	1940–55	10 to 11	60	140.5	55.3	35.5	78.1	Taylor n.p.
New York	1948–51	10±½	15	139.4	54.9	35.9	79.2	Young n.p.
Pennsylvania	1937–39	10 to 11	436	137.6	54.2	32.3	71.2	O'Brien 1941
North Central:								
Ohio	1931–42	10.0	238	141.0	55.5	35.4	78.1	Simmons 1944
Ohio	1937–39	10 to 11	311	136.9	53.9	31.0	68.4	O'Brien 1941
Ohio	1948–51	10 to 11	148	141.0	55.5	34.6	76.3	Patton n.p.
Illinois	(1923–37)	10(±½)	184	132.1	52.0	27.8	61.3	Hardy 1938
Illinois	1927–28	10 to 11	7	134.2	52.8	32.1	70.7	Wait 1932
Illinois	(1930–36)	10.0	102	139.4	54.9	33.7	74.3	Richey 1937
Illinois	(1936–37)	10 to 11	10	132.9	52.3	28.4	62.6	Schlutz 1938
Illinois	1937–39	10 to 11	382	138.3	54.4	32.9	72.5	O'Brien 1941
Illinois	(1939–40)	10 to 11	5	139.2	54.8	35.0	77.2	Johnston 1943
Michigan	(<1936)	10±½	204	138.7	54.6	30.0	66.1	Steggerda 1936
Michigan	1937–39	10 to 11	208	138.6	54.6	32.5	71.7	O'Brien 1941
Michigan	1954	10±½	79	139.2	54.8	34.6	76.3	Martin 1955
Minnesota	1932–33	10(±½)	278	142.0	55.9	32.7	72.0	Weisman 1935
Minnesota	1937–39	10 to 11	660	138.5	54.5	32.1	70.8	O'Brien 1941
Iowa	1920–27	10±½	92	137.3	54.1	31.6	69.7	Meredith 1941a
Iowa	1920–35	10±½	214	137.6	54.2	31.6	69.7	Boynton 1936
Iowa	1923–27	10±½	67	134.5	53.0	30.2	66.5	Baldwin 1930
Iowa	1930–37	10±½	120	139.1	54.8	33.0	72.8	Meredith 1941a
Iowa	1937–39	10 to 11	542	138.3	54.4	32.2	70.9	O'Brien 1941
Iowa	1948–51	10 to 11	61	140.8	55.4	35.3	77.8	Eppright 1954
Nebraska	1937–39	10 to 11	264	138.4	54.5	31.3	69.0	O'Brien 1941
Kansas	1937–39	10 to 11	409	138.6	54.6	31.7	69.9	O'Brien 1941
Kansas	1948–51	10 to 11	149	141.2	55.6	34.6	76.3	Marlatt n.p.
Southern:								
Maryland	1937–40	10 to 11	1,019	136.9	53.9	31.2	68.8	Wolff 1941, 1942
Maryland	1947	10(±½)	70	139.2	54.8	31.8	70.0	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	10 to 11	538	138.0	54.3	32.3	71.1	O'Brien 1941
Virginia	1918–30	10±½	24	136.3	53.7	--------	--------	Bean 1931
Virginia	1951–52	10±½	21	139.4	54.9	33.3	73.4	Dean n.p.
South Carolina	1940–42	10±½	55	134.1	52.8	28.4	62.6	Moser 1945
Tennessee	1932	10(±½)	107	136.3	53.7	30.1	66.4	Wheeler 1933
Tennessee	1937–39	10 to 11	377	136.5	53.7	30.5	67.2	O'Brien 1941
Alabama	1937–39	10 to 11	584	137.5	54.1	30.8	67.8	O'Brien 1941
Alabama	1942–52	10 to 11	118	140.0	55.1	35.5	78.3	Dreizen 1953
Alabama	1947	10(±½)	68	137.4	54.2	31.3	69.1	Martin 1948
Louisiana	1948–49	10±½	79	138.7	54.6	32.0	70.5	Moschette n.p. (a)
Louisiana	1950–51	10±½	68	136.8	53.9	32.3	71.1	Moschette n.p. (b)
Texas	1929–31	10±½	270	135.4	53.3	30.0	66.2	Whitacre 1939
Texas	1937–39	10 to 11	453	139.1	54.8	32.4	71.4	O'Brien 1941
Western:								
Wyoming	1929–34	10±½	86	136.9	53.9	29.4	64.9	Follstad 1938
Colorado	1934–41	10 to 11	39	144.5	56.9	34.7	76.5	Duval 1942
Colorado	1937–39	10 to 11	419	138.2	54.4	30.8	67.8	O'Brien 1941
Utah	(1931–35)	10±½	1,406	135.9	53.5	29.4	64.8	Brown 1936
Utah	(1937)	10±½	27	132.1	52.0	33.4	73.6	Brown 1942
Utah	1937–39	10 to 11	399	138.3	54.4	30.6	67.4	O'Brien 1941
Utah	1950–51	10 to 11	9	134.4	52.9	29.0	64.0	Wilcox n.p. (a)
Utah	1954–55	10 to 11	57	141.2	55.6	35.1	77.4	Wilcox n.p. (b)
California	1923	10.0	42	135.9	53.5	32.3	71.3	Baldwin 1925b
California	1931–47	10.0	70	141.0	55.5	35.9	79.1	Tuddenham 1954
California	1936–38	10±½	4,815	137.9	54.3	32.5	71.7	Lloyd-Jones 1940, 1941
California	1937–39	10 to 11	271	140.9	55.5	35.3	77.8	O'Brien 1941

See footnote at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
General Regional:								
Northeast	1922–24	10±½	559	135.1	53.2	30.3	66.9	}Palmer 1935
North Central	1922–24	10±½	494	134.4	52.9	30.1	66.3	
South (Central)	1922–24	10±½	580	134.1	52.8	29.3	64.7	
West (Mountain)	1922–24	10±½	139	134.6	53.0	28.6	63.0	
N. E., N. C., West	(1926–30)	10±½	110	140.1	55.2	35.2	77.6	Gray 1931
U. S. (16 States and D. C.)	1937–39	10 to 11	6,253	138.2	54.4	31.8	70.2	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 26a.—*Standards used for 10-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	127	50	26.8	59	}Baldwin 1923
	Medium	137	54	31.8	70	
	Tall	145	57	37.2	82	
Stuart-Meredith	10th percentile	131.7	51.9	25.9	57.1	}Stuart 1946b
	25th percentile	134.6	53.0	28.5	62.8	
	50th percentile	138.6	54.6	31.9	70.3	
	75th percentile	142.6	56.1	35.9	79.1	
	90th percentile	146.0	57.5	40.7	89.7	

TABLE 27.—ELEVEN-YEAR-OLD GIRLS: *Heights and weights by region, State, and date of study*

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi- meters	Inches	Kilo- grams	Pounds	
Northeast:								
Maine	1934–36	11±1⁄2	106	140.7	55.4	32.5	71.6	Clayton 1940
Maine	1936–40	11±1⁄2	104	141.7	55.8	33.4	73.7	Clayton 1944
Massachusetts	1922–31	11 to 12	275	141.4	55.7	35.5	78.3	Wilson 1935
Massachusetts	1922–34	11±1⁄4	747	138.7	54.6	33.5	73.9	Shuttleworth 1939
Massachusetts	1931–33	11 to 12	14	151.4	59.6	42.4	93.5	Talbot 1937
Massachusetts	1935–40	11±1⁄2	20	145.3	57.2	37.9	83.3	Miller 1943
New York	1926–31	11 to 12	16	142.2	56.0	39.8	87.7	Topper 1932
New York	(<1933)	11±1⁄6	11	147.9	58.2	38.4	84.7	Freeman 1933
New York	1934–39	11 to 12	13	143.7	56.6	36.5	80.5	Webster 1941
New York	1940–55	11 to 12	73	145.7	57.4	41.0	90.2	Taylor n.p.
New York	1948–51	11±1⁄2	8	143.8	56.6	40.1	88.5	Young n.p.
Pennsylvania	1937–39	11 to 12	477	143.1	56.3	36.3	80.0	O'Brien 1941
North Central:								
Ohio	1931–42	11.0	220	147.7	58.1	40.1	88.4	Simmons 1944
Ohio	1937–39	11 to 12	298	142.6	56.1	34.3	75.6	O'Brien 1941
Ohio	1948–51	11 to 12	108	147.3	58.0	39.0	86.0	Patton n.p.
Illinois	(1923–37)	11(±1⁄2)	173	137.4	54.1	30.7	67.7	Hardy 1938
Illinois	1927–28	11 to 12	5	139.6	55.0	37.0	81.6	Wait 1932
Illinois	(1930–36)	11.0	127	145.0	57.1	38.1	83.8	Richey 1937
Illinois	(1936–37)	11 to 12	12	141.5	55.7	35.4	78.0	Schlutz 1938
Illinois	1937–39	11 to 12	407	144.2	56.8	36.9	81.3	O'Brien 1941
Michigan	(<1936)	11±1⁄2	177	144.3	56.8	33.8	74.6	Steggerda 1936
Michigan	1937–39	11 to 12	219	143.2	56.4	35.5	78.3	O'Brien 1941
Michigan	1954	11±1⁄2	99	146.6	57.7	40.0	88.2	Martin 1955
Minnesota	1932–33	11(±1⁄2)	266	146.8	57.8	34.6	76.3	Weisman 1935
Minnesota	1937–39	11 to 12	635	144.2	56.8	36.4	80.2	O'Brien 1941
Iowa	1920–27	11±1⁄2	94	142.6	56.1	34.9	76.9	Meredith 1941a
Iowa	1920–35	11±1⁄2	203	143.6	56.5	35.8	78.9	Boynton 1936
Iowa	1923–27	11±1⁄2	64	138.7	54.6	32.3	71.3	Baldwin 1930
Iowa	1930–37	11±1⁄2	118	144.6	56.9	36.5	80.5	Meredith 1941a
Iowa	1937–39	11 to 12	540	144.1	56.7	35.8	78.9	O'Brien 1941
Iowa	1948–51	11 to 12	58	146.0	57.5	40.1	88.4	Eppright 1954
Nebraska	1937–39	11 to 12	194	145.3	57.2	36.2	79.9	O'Brien 1941
Kansas	1937–39	11 to 12	473	145.4	57.2	36.6	80.6	O'Brien 1941
Kansas	1948–51	11 to 12	170	145.7	57.4	38.8	85.5	Marlatt n.p.
Southern:								
Maryland	1937–40	11 to 12	1,004	143.2	56.4	35.5	78.2	Wolff 1941, 1942
Maryland	1947	11(±1⁄2)	57	144.3	56.8	37.6	83.0	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	11 to 12	478	144.3	56.8	36.1	79.5	O'Brien 1941
Virginia	1918–30	11±1⁄2	13	139.8	55.0			Bean 1931
Virginia	1951–52	11±1⁄2	8	145.5	57.3	35.0	77.1	Dean n.p.
South Carolina	1940–42	11±1⁄2	49	139.2	54.8	31.9	70.3	Moser 1945
Tennessee	1932	11(±1⁄2)	91	139.4	54.9	33.5	73.9	Wheeler 1933
Tennessee	1937–39	11 to 12	322	142.1	55.9	33.9	74.7	O'Brien 1941
Alabama	1937–39	11 to 12	562	143.9	56.7	34.2	75.5	O'Brien 1941
Alabama	1942–52	11 to 12	121	147.3	58.0	40.1	88.4	Dreizen 1953
Alabama	1947	11(±1⁄2)	50	142.2	56.0	34.2	75.3	Martin 1948
Louisiana	1948–49	11±1⁄2	89	142.5	56.1	34.4	75.8	Moschette n.p. (a)
Louisiana	1950–51	11±1⁄2	60	142.6	56.1	36.3	80.0	Moschette n.p. (b)
Texas	1929–31	11±1⁄2	203	140.2	55.2	32.9	72.5	Whitacre 1939
Texas	1937–39	11 to 12	532	145.0	57.1	35.8	79.0	O'Brien 1941
Western:								
Wyoming	1929–34	11±1⁄2	72	143.0	56.3	32.3	71.2	Follstad 1938
Colorado	1934–41	11 to 12	28	151.7	59.4	40.2	88.6	Duval 1942
Colorado	1937–39	11 to 12	369	143.4	56.5	34.2	75.5	O'Brien 1941
Utah	(1931–35)	11±1⁄2	1,334	141.5	55.7	33.0	72.7	Brown 1936
Utah	(1937)	11±1⁄2	27	142.0	55.9	34.9	77.0	Brown 1942
Utah	1937–39	11 to 12	352	143.9	56.7	34.3	75.7	O'Brien 1941
Utah	1950–51	11 to 12	12	147.1	57.9	36.8	81.2	Wilcox n.p. (a)
Oregon	1951–52	11±1⁄6	145	144.4	56.9	37.5	82.7	Meredith 1953
California	1923	11.0	48	143.5	56.5	37.6	83.0	Baldwin 1925b
California	1931–47	11.0	70	147.6	58.1	40.7	89.7	Tuddenham 1954
California	1936–38	11±1⁄2	5,232	143.8	56.6	36.4	80.3	Lloyd-Jones 1940, 1941
California	1937–39	11 to 12	274	146.8	57.8	39.5	87.0	O'Brien 1941

See footnote at end of table.

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Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi-meters	Inches	Kilo-grams	Pounds	
General Regional:								
Northeast	1922–24	11±½	563	140.2	55.2	34.5	76.1	} Palmer 1935
North Central	1922–24	11±½	485	140.7	55.4	33.9	74.7	
South (Central)	1922–24	11±½	554	139.4	54.9	33.0	72.8	
West (Mountain)	1922–24	11±½	116	140.2	55.2	31.9	70.4	
N.E., N. C., West	(1926–30)	11±½	139	146.1	57.5	39.1	86.6	Gray 1931
U. S. (16 States and D. C.)	1937–39	11 to 12	6,132	144.1	56.7	35.7	78.8	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 27a.—*Standards used for 11-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	Inches	Kilo-grams	Pounds	
Baldwin-Wood	Short	132	52	29.5	65	} Baldwin 1923
	Medium	142	56	35.4	78	
	Tall	150	59	40.8	90	
Stuart-Meredith	10th percentile	137.0	53.9	28.4	62.6	} Stuart 1946b
	25th percentile	140.3	55.2	31.7	69.9	
	50th percentile	144.7	57.0	35.7	78.8	
	75th percentile	149.2	58.7	40.4	89.1	
	90th percentile	153.4	60.4	45.5	100.4	

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1934–36	12±½	103	145.5	57.3	36.7	80.8	Clayton 1940
Maine	1936–40	12±½	108	148.1	58.3	38.4	84.6	Clayton 1944
Maine	1948–51	12±½	12	154.9	61.0	46.5	102.5	Clayton n.p.
Massachusetts	1922–31	12 to 13	275	148.0	58.3	40.6	89.5	Wilson 1935
Massachusetts	1922–34	12±¼	747	145.2	57.2	38.3	84.5	Shuttleworth 1939
Massachusetts	1931–33	12 to 13	11	155.6	61.3	47.9	105.6	Talbot 1937
Massachusetts	1935–40	12±½	20	152.3	60.0	43.1	95.1	Miller 1943
New York	1920	12 to 13	20	151.0	59.4	39.8	87.7	Benedict 1921
New York	1926–31	12 to 13	31	147.2	58.0	42.5	93.7	Topper 1932
New York	(<1933)	12±⅙	12	148.1	58.3	40.1	88.4	Freeman 1933
New York	1934–39	12 to 13	17	148.3	58.4	38.9	85.8	Webster 1941
New York	1940–55	12 to 13	39	151.3	59.6	44.8	98.7	Taylor n.p.
New York	1948–51	12±½	33	152.1	59.9	44.9	98.9	Young n.p.
Pennsylvania	1937–39	12 to 13	549	148.5	58.5	40.5	89.3	O'Brien 1941
North Central:								
Ohio	1931–42	12.0	234	154.2	60.7	45.5	100.4	Simmons 1944
Ohio	1937–39	12 to 13	247	149.6	58.9	39.8	87.8	O'Brien 1941
Ohio	1948–51	12 to 13	30	152.3	60.0	42.4	93.5	Patton n.p.
Illinois	(1923–37)	12(±½)	84	142.5	56.1	33.0	72.8	Hardy 1938
Illinois	1927–28	12 to 13	10	150.0	59.0	46.3	102.1	Wait 1932
Illinois	(1930–36)	12.0	158	151.9	59.8	42.6	94.0	Richey 1937
Illinois	1937–39	12 to 13	351	149.4	58.8	40.4	89.1	O'Brien 1941
Michigan	(<1936)	12±½	161	151.1	59.5	38.4	84.6	Steggerda 1936
Michigan	1937–39	12 to 13	133	148.1	58.3	38.6	85.0	O'Brien 1941
Michigan	1954	12±½	104	151.6	59.7	44.6	98.4	Martin 1955
Minnesota	1932–33	12(±½)	162	151.4	59.6	38.0	83.8	Weisman 1935
Minnesota	1937–39	12 to 13	514	150.9	59.4	41.2	90.9	O'Brien 1941
Iowa	1920–27	12±½	95	148.9	58.6	39.9	88.0	Meredith 1941a
Iowa	1920–35	12±½	204	150.3	59.2	40.7	89.7	Boynton 1936
Iowa	1923–27	12±½	39	143.4	56.5	36.0	79.4	Baldwin 1930
Iowa	1930–37	12±½	129	151.2	59.5	41.4	91.3	Meredith 1941a
Iowa	1937–39	12 to 13	323	149.9	59.0	40.6	89.5	O'Brien 1941
Iowa	1948–51	12 to 13	82	151.4	59.6	45.6	100.5	Eppright 1954
Nebraska	1937–39	12 to 13	171	149.6	58.9	39.5	87.0	O'Brien 1941
Kansas	1937–39	12 to 13	580	150.7	59.3	41.3	91.1	O'Brien 1941
Kansas	1948–51	12 to 13	48	151.2	59.5	44.1	97.2	Marlatt n.p.
Southern:								
Maryland	1937–40	12 to 13	1,091	149.5	58.9	40.9	90.1	Wolff 1941, 1942
Maryland	1947	12(±½)	37	147.8	58.2	39.5	87.1	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	12 to 13	680	151.3	59.6	41.8	92.2	O'Brien 1941
Virginia	1918–30	12±½	19	150.5	59.3	---------	---------	Bean 1931
Virginia	1944–47	12±½	10	147.3	58.0	37.0	81.5	Dean 1955
South Carolina	1940–42	12±½	46	146.8	57.8	39.1	86.3	Moser 1945
Tennessee	1932	12(±½)	83	145.5	57.3	36.0	79.4	Wheeler 1933
Tennessee	1937–39	12 to 13	302	148.6	58.5	38.6	85.2	O'Brien 1941
Alabama	1937–39	12 to 13	567	149.8	59.0	38.6	85.1	O'Brien 1941
Alabama	1942–52	12 to 13	151	152.9	60.2	44.7	98.5	Dreizen 1953
Alabama	1947	12(±½)	23	143.5	56.5	33.1	73.0	Martin 1948
Louisiana	1948–49	12±½	66	149.6	58.9	40.4	89.1	Moschette n.p. (a)
Texas	1929–31	12±½	106	145.5	57.3	35.5	78.2	Whitacre 1939
Texas	1937–39	12 to 13	576	151.4	59.6	40.7	89.8	O'Brien 1941
Western:								
Wyoming	1929–34	12±½	54	149.9	59.0	38.0	83.8	Follstad 1938
Colorado	1934–41	12 to 13	25	155.4	61.2	43.4	95.7	Duval 1942
Colorado	1937–39	12 to 13	345	149.4	58.8	38.8	85.6	O'Brien 1941
Utah	(1931–35)	12±½	1,323	147.8	58.2	37.3	82.3	Brown 1936
Utah	(1937)	12±½	31	150.6	59.3	39.7	87.6	Brown 1942
Utah	1937–39	12 to 13	253	149.3	58.8	38.3	84.4	O'Brien 1941
Utah	1950–51	12 to 13	11	151.4	59.6	41.1	90.5	Wilcox n.p. (a)
California	1923	12.0	45	147.3	58.0	39.8	87.7	Baldwin 1925b
California	1931–47	12.0	70	154.5	60.8	46.1	101.6	Tuddenham 1954
California	1936–38	12±½	5,029	150.4	59.2	41.4	91.3	Lloyd-Jones 1940, 1941
California	1937–39	12 to 13	274	152.3	60.0	43.9	96.8	O'Brien 1941

See footnote at end of table.

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi- meters*	*Inches*	*Kilo- grams*	*Pounds*	
General Regional:								
Northeast_____	1922–24	12±½	580	145.8	57.4	38.6	85.0	
North Central_____	1922–24	12±½	458	146.3	57.6	38.1	84.1	}Palmer 1935
South (Central)_____	1922–24	12±½	579	146.0	57.5	37.3	82.3	
West (Mountain)_____	1922–24	12±½	119	145.0	57.1	35.1	77.3	
N. E., N. C., West_____	(1926–30)	12±½	126	152.0	59.8	43.7	96.3	Gray 1931
U. S. (16 States and D. C.)	1937–39	12 to 13	5,865	150.1	59.1	40.4	89.1	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 28a.—*Standards used for 12-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centi- meters	*Inches*	*Kilo- grams*	*Pounds*	
Baldwin-Wood_____	Short_____	137	54	32.2	71	
	Medium_____	147	58	39.0	86	}Baldwin 1923
	Tall_____	157	62	47.6	105	
Stuart-Meredith_____	10th percentile_____	142.6	56.1	31.5	69.5	
	25th percentile_____	145.9	57.4	35.4	78.0	
	50th percentile_____	151.5	59.6	39.7	87.6	}Stuart 1946b
	75th percentile_____	156.6	61.7	44.8	98.8	
	90th percentile_____	160.6	63.2	50.6	111.5	

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	13±1/2	68	150.9	59.4	42.3	93.2	Clayton 1940
Maine	1936–40	13±1/2	79	153.7	60.5	43.5	96.0	Clayton 1944
Maine	1948–51	13±1/2	47	155.2	61.1	48.3	106.4	Clayton n.p.
Massachusetts	1922–31	13 to 14	275	153.4	60.4	45.8	101.0	Wilson 1935
Massachusetts	1922–34	13±1/4	747	151.4	59.6	43.7	96.3	Shuttleworth 1939
Massachusetts	1931–33	13 to 14	11	159.5	62.8	53.9	118.8	Talbot 1937
Massachusetts	1935–40	13±1/2	12	161.0	63.4	50.7	111.8	Miller 1943
New York	1920	13 to 14	30	156.1	61.4	47.0	103.6	Benedict 1921
New York	1926–31	13 to 14	32	153.0	60.2	47.4	104.5	Topper 1932
New York	(<1933)	13.5±1/6	6	163.5	64.4	52.0	114.6	Freeman 1933
New York	1934–39	13 to 14	17	154.1	60.7	44.7	98.5	Webster 1941
New York	1940–55	13 to 14	21	156.9	61.7	50.2	110.5	Taylor n.p.
New York	1948–51	13±1/2	56	156.1	61.4	49.8	109.7	Young n.p.
Pennsylvania	1937–39	13 to 14	545	154.0	60.6	45.7	100.7	O'Brien 1941
North Central:								
Ohio	1931–42	13.0	197	159.6	62.8	50.1	110.4	Simmons 1944
Ohio	1937–39	13 to 14	197	153.6	60.5	43.9	96.8	O'Brien 1941
Ohio	1948–51	13 to 14	7	153.3	60.4	45.0	99.2	Patton n.p.
Illinois	1927–28	13 to 14	5	159.5	62.8	50.6	114.2	Wait 1932
Illinois	(1930–36)	13.0	194	157.0	61.8	47.4	104.6	Richey 1937
Illinois	1937–39	13 to 14	299	154.0	60.6	45.4	99.6	O'Brien 1941
Michigan	(<1936)	13±1/2	213	157.2	61.9	43.2	95.2	Steggerda 1936
Michigan	1937–39	13 to 14	72	151.4	59.6	41.4	91.6	O'Brien 1941
Michigan	1954	13±1/2	131	155.7	61.3	47.8	105.4	Martin 1955
Minnesota	1932–33	13(±1/2)	122	156.5	61.6	44.0	97.0	Weisman 1935
Minnesota	1937–39	13 to 14	603	155.7	61.3	45.9	101.2	O'Brien 1941
Iowa	1920–27	13±1/2	77	155.1	61.1	44.7	98.5	Meredith 1941a
Iowa	1920–35	13±1/2	183	156.0	61.4	45.5	100.3	Boynton 1936
Iowa	1923–27	13±1/2	59	152.2	59.9	42.9	94.5	Baldwin 1930
Iowa	1930–37	13±1/2	141	156.8	61.7	46.1	101.6	Meredith 1941a
Iowa	1937–39	13 to 14	181	153.9	60.6	44.1	97.2	O'Brien 1941
Iowa	1948–51	13 to 14	44	153.2	60.3	46.8	103.2	Eppright 1954
Nebraska	1937–39	13 to 14	118	154.9	61.0	43.8	95.8	O'Brien 1941
Kansas	1937–39	13 to 14	638	155.5	61.2	45.0	99.1	O'Brien 1941
Kansas	1948–51	13 to 14	5	151.0	59.4	45.0	99.2	Marlatt n.p.
Southern:								
Maryland	1937–40	13 to 14	1,115	154.7	60.9	45.9	101.1	Wolff 1941, 1942
Maryland	1947	13(±1/2)	9	152.7	60.1	42.6	93.9	U. S. P. H. S. n.p.
Md., D. C., Va.	1937–39	13 to 14	641	155.4	61.2	46.0	101.5	O'Brien 1941
Virginia	1918–30	13±1/2	35	154.0	60.6			Bean 1931
Virginia	1944–47	13±1/2	12	155.4	61.2	43.3	95.5	Dean 1955
South Carolina	1940–42	13±1/2	38	155.1	61.1	44.3	97.6	Moser 1945
Tennessee	1932	13(±1/2)	79	152.4	60.0	44.5	98.1	Wheeler 1933
Tennessee	1937–39	13 to 14	232	153.9	60.6	42.1	92.8	O'Brien 1941
Alabama	1937–39	13 to 14	544	155.4	61.2	43.5	96.0	O'Brien 1941
Alabama	1942–52	13 to 14	112	158.0	62.2	48.3	106.5	Dreizen 1953
Alabama	1947	13(±1/2)	6	153.7	60.5	42.9	94.5	Martin 1948
Louisiana	1948–49	13 to 14	20	149.1	58.7	39.2	86.4	Moschette n.p. (a)
Texas	1929–31	13±1/2	24	148.6	58.5	39.1	86.2	Whitacre 1939
Texas	1937–39	13 to 14	443	156.0	61.4	44.8	98.8	O'Brien 1941
Western:								
Wyoming	1929–34	13±1/2	29	154.4	60.8	41.5	91.6	Follstad 1938
Colorado	1934–41	13 to 14	24	161.5	63.6	49.5	109.1	Duval 1942
Colorado	1937–39	13 to 14	265	154.8	60.9	43.5	96.0	O'Brien 1941
Utah	(1931–35)	13±1/2	1,418	154.4	60.8	42.4	93.5	Brown 1936
Utah	1937–39	13 to 14	129	153.6	60.5	42.0	92.5	O'Brien 1941
Utah	1950–51	13 to 14	16	157.2	61.9	47.1	103.9	Wilcox n.p. (a)
California	1923	13.0	46	155.2	61.1	48.3	106.5	Baldwin 1925b
California	1931–47	13.0	70	159.8	62.9	51.4	113.3	Tuddenham 1954
California	1936–38	13±1/2	5,080	155.7	61.3	46.4	102.2	Lloyd-Jones 1940, 1941
California	1937–39	13 to 14	226	156.5	61.6	48.4	106.8	O'Brien 1941

See footnote at end of table.

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
General Regional:								
Northeast	1922–24	13±½	550	152.4	60.0	43.8	96.5	} Palmer 1935
North Central	1922–24	13±½	483	152.1	59.9	43.7	96.4	
South (Central)	1922–24	13±½	546	151.9	59.8	41.9	92.3	
West (Mountain)	1922–24	13±½	78	151.1	59.5	39.4	86.9	
N. E., N. C., West	(1926–30)	13±½	124	157.2	61.9	47.9	105.6	Gray 1931
U. S. (16 States and D. C.)	1937–39	13 to 14	5,133	155.0	61.0	44.9	98.9	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 29a.—*Standards used for 13-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	145	57	38.1	84	} Baldwin 1923
	Medium	152	60	43.9	97	
	Tall	163	64	52.2	115	
Stuart-Meredith	10th percentile	149.1	58.7	36.2	79.9	} Stuart 1946b
	25th percentile	152.6	60.1	40.6	89.4	
	50th percentile	157.1	61.9	45.0	99.1	
	75th percentile	161.5	63.6	50.3	111.0	
	90th percentile	164.8	64.9	56.5	124.5	

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centi- meters	Inches	Kilo- grams	Pounds	
Northeast:								
Maine	1934–36	14±½	45	154.7	60.9	49.1	101.6	Clayton 1940
Maine	1936–40	14±½	36	156.2	61.5	46.6	102.7	Clayton 1944
Maine	1948–51	14±½	147	159.0	62.6	50.8	112.1	Clayton n.p.
Massachusetts	1922–31	14 to 15	275	156.7	61.7	49.9	110.0	Wilson 1935
Massachusetts	1922–34	14±¼	745	155.6	61.2	48.2	106.3	Shuttleworth 1939
Massachusetts	1931–33	14 to 15	14	163.1	64.2	54.8	120.8	Talbot 1937
Massachusetts	1935–40	14±½	7	168.1	66.2	53.2	117.3	Miller 1943
New York	1920	14 to 15	25	159.3	62.6	49.3	108.7	Benedict 1921
New York	1926–31	14 to 15	16	160.0	63.0	51.5	113.5	Topper 1932
New York	(<1933)	14.5±⅙	9	164.5	64.8	54.3	119.7	Freeman 1933
New York	1934–39	14 to 15	16	156.4	61.6	50.4	111.1	Webster 1941
New York	1940–55	14 to 15	12	159.8	62.9	56.1	123.4	Taylor n.p.
New York	1948–51	14±½	51	159.3	62.7	50.4	111.1	Young n.p.
Pennsylvania	1937–39	14 to 15	405	156.3	61.5	48.2	106.3	O'Brien 1941
North Central:								
Ohio	1926–27	14±½	7	158.0	62.2	49.3	108.7	McKay 1930
Ohio	1931–42	14.0	171	162.9	64.1	54.5	120.2	Simmons 1944
Ohio	1937–39	14 to 15	124	157.2	61.9	47.6	104.9	O'Brien 1941
Illinois	1927–28	14 to 15	6	159.4	62.8	58.3	130.3	Wait 1932
Illinois	(1930–36)	14.0	276	160.3	63.1	51.0	112.4	Richey 1937
Illinois	1937–39	14 to 15	156	157.3	61.9	49.2	180.4	O'Brien 1941
Michigan	(<1936)	14±½	207	161.5	63.6	47.2	104.0	Steggerda 1936
Michigan	1937–39	14 to 15	60	157.2	61.9	47.0	103.7	O'Brien 1941
Michigan	1954	14±½	143	159.8	62.9	53.1	117.1	Martin 1955
Minnesota	1932–33	14(±½)	76	158.8	62.5	45.0	99.2	Weisman 1935
Minnesota	1937–39	14 to 15	469	158.2	62.3	49.3	108.6	O'Brien 1941
Iowa	1920–27	14±½	74	158.8	62.5	49.7	109.6	Meredith 1941a
Iowa	1920–35	14±½	188	159.4	62.8	50.3	110.9	Boynton 1936
Iowa	1923–27	14±½	68	158.3	62.3	48.2	106.3	Baldwin 1930
Iowa	1930–37	14±½	164	159.5	62.8	50.2	110.7	Meredith 1941a
Iowa	1937–39	14 to 15	134	158.6	62.4	48.1	106.0	O'Brien 1941
Iowa	1948–51	14 to 15	37	159.4	62.8	51.3	113.1	Eppright 1954
Nebraska	1937–39	14 to 15	41	157.8	62.1	47.5	104.7	O'Brien 1941
Kansas	1937–39	14 to 15	504	158.2	62.3	48.7	107.4	O'Brien 1941
Southern:								
Maryland	1937–40	14 to 15	1,017	157.6	62.0	49.4	108.8	Wolff 1941, 1942
Md., D. C., Va.	1937–39	14 to 15	470	157.2	61.9	47.9	105.5	O'Brien 1941
Virginia	1918–30	14±½	21	154.9	61.0			Bean 1931
Virginia	1944–47	14±½	16	158.5	62.4	47.4	104.5	Dean 1955
South Carolina	1940–42	14±½	18	157.1	61.9	46.3	102.0	Moser 1945
Tennessee	1932	14(±½)	60	155.2	61.1	47.2	104.1	Wheeler 1933
Tennessee	1937–39	14 to 15	149	156.8	61.7	45.5	100.2	O'Brien 1941
Alabama	1937–39	14 to 15	421	158.7	62.5	46.9	103.4	O'Brien 1941
Alabama	1942–52	14 to 15	166	160.3	63.1	50.8	111.9	Dreizen 1953
Louisiana	1948–49	14 to 15	5	152.9	60.2	43.8	96.5	Moschette n.p. (a)
Texas	1937–39	14 to 15	304	159.2	62.7	47.9	105.5	O'Brien 1941
Western:								
Montana	1951–52	14 to 15	21	162.1	63.8	51.1	113.5	Odland n.p.
Colorado	1934–41	14 to 15	14	164.2	64.6	54.8	120.8	Duval 1942
Colorado	1937–39	14 to 15	172	158.7	62.5	47.8	105.4	O'Brien 1941
Colorado	1949–50	14 to 15	27	160.3	63.1	50.2	110.7	Dyar n.p.
New Mexico	1949–50	14 to 15	20	154.2	60.7	48.7	107.4	Lantz n.p.
Arizona	1940–47	14 to 15	23	162.6	64.0	52.6	116.0	Thompson 1948
Utah	(1931–35)	14±½	1,493	158.2	62.3	46.8	103.2	Brown 1936
Utah	1937–39	14±½	36	155.9	61.4	44.2	97.4	O'Brien 1941
Utah	1950–51	14 to 15	20	160.0	63.0	51.6	113.8	Wilcox n.p. (a)
Washington	1951–52	14 to 15	35	159.8	62.9	51.9	114.4	Esselbaugh n.p.
Oregon	1947–48	14 to 15	154	161.5	63.6	55.0	121.3	Storvick n.p.
California	1923	14.0	29	158.2	62.3	51.8	114.2	Baldwin 1925b
California	1931–47	14.0	70	163.1	64.2	54.9	121.0	Tuddenham 1954
California	1936–38	14±½	4,766	159.0	62.6	50.0	110.3	Lloyd-Jones 1940, 1941
California	1937–39	14 to 15	188	158.9	62.5	51.2	112.8	O'Brien 1941

See footnote at end of table.

TABLE 30.—FOURTEEN-YEAR-OLD GIRLS: *Heights and weights by region, State, and date of study*—Continued

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
General Regional:								
Northeast	1922–24	14±½	526	155.7	61.3	48.1	106.0	⎫
North Central	1922–24	14±½	380	155.2	61.1	46.5	102.6	⎬ Palmer 1935
South (Central)	1922–24	14±½	420	155.4	61.2	45.2	99.7	⎪
West (Mountain)	1922–24	14±½	38	153.9	60.6	45.7	100.8	⎭
N. E., N. C., West	(1926–30)	14±½	108	160.1	63.0	50.7	111.8	Gray 1931
U. S. (16 States and D. C.)	1937–39	14 to 15	3,633	157.9	62.2	48.2	106.2	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 30a.—*Standards used for 14-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	150	59	43.5	96	⎫
	Medium	157	62	49.4	109	⎬ Baldwin 1923
	Tall	168	66	56.2	124	⎭
Stuart-Meredith	10th percentile	153.0	60.2	41.3	91.0	⎫
	25th percentile	156.1	61.5	45.3	99.8	⎪
	50th percentile	159.6	62.8	49.2	108.4	⎬ Stuart 1946b
	75th percentile	163.7	64.4	54.3	119.7	⎪
	90th percentile	167.0	65.7	60.5	133.3	⎭

TABLE 31.—FIFTEEN-YEAR-OLD GIRLS: *Heights and weights by region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	Number	Centimeters	Inches	Kilograms	Pounds	
Northeast:								
Maine	1934–36	15±1½	12	159.8	62.9	46.5	102.6	Clayton 1940
Maine	1936–40	15±1½	18	156.2	61.5	45.6	100.5	Clayton 1944
Maine	1948–51	15±1½	127	159.5	62.8	52.2	115.0	Clayton n.p.
Massachusetts	1922–31	15 to 16	275	158.5	62.4	52.6	116.0	Wilson 1935
Massachusetts	1922–34	15±¼	727	157.8	62.1	51.5	113.6	Shuttleworth 1939
Massachusetts	1931–33	15 to 16	15	166.5	65.6	58.5	129.0	Talbot 1937
Rhode Island	1948–51	15±1½	42	163.1	64.2	56.5	124.5	Tucker n.p.
New York	1920	15 to 16	11	163.1	64.2	54.6	120.4	Benedict 1921
New York	1926–31	15 to 16	9	160.3	63.1	52.4	115.5	Topper 1932
New York	1934–39	15 to 16	9	156.2	61.5	51.3	113.1	Webster 1941
New York	1940–55	15 to 16	7	165.6	65.2	53.0	116.7	Taylor n.p.
New York	1948–51	15±½	7	156.0	61.4	52.2	115.1	Young n.p.
North Central:								
Ohio	1926–27	15±1½	17	162.0	63.8	52.5	115.7	McKay 1930
Ohio	1931–42	15.0	137	164.8	64.9	57.4	126.6	Simmons 1944
Illinois	(1930–36)	15.0	297	162.6	64.0	53.4	117.8	Richey 1937
Michigan	(<1936)	15±1½	153	162.8	64.1	48.8	107.5	Steggerda 1936
Michigan	1954	15±1½	170	161.3	63.5	54.8	120.8	Martin 1955
Minnesota	1932–33	15(±½)	24	160.0	63.0	48.4	106.6	Weisman 1935
Iowa	1920–27	15±1½	80	161.1	63.4	51.9	114.4	Meredith 1941a
Iowa	1920–35	15±1½	206	160.7	63.3	53.6	118.2	Boynton 1936
Iowa	1923–27	15±1½	74	158.5	62.4	50.7	111.8	Baldwin 1930
Iowa	1930–37	15±1½	180	161.2	63.5	52.9	116.2	Meredith 1941a
Iowa	1948–51	15 to 16	38	161.2	63.5	56.6	124.8	Eppright 1954
Southern:								
Maryland	1937–40	15 to 16	667	159.0	62.6	51.8	114.1	Wolff 1941, 1942
Virginia	1944–47	15±½	14	160.8	63.3	49.2	108.4	Dean 1955
South Carolina	1940–42	15±½	10	153.5	60.4	47.7	105.1	Moser 1945
Tennessee	1932	15(±½)	56	158.7	62.5	48.8	107.6	Wheeler 1933
Alabama	1942–52	15 to 16	141	161.3	63.5	52.3	115.4	Dreizen 1953
Western:								
Montana	1951–52	15 to 16	81	163.3	64.3	56.1	123.6	Odland n.p.
Idaho	1951	15 to 16	72	162.1	63.8	54.5	120.1	Warnick n.p.
Colorado	1934–41	15 to 16	14	167.8	66.1	55.4	122.1	Duval 1942
Colorado	1949–50	15 to 16	30	160.3	63.1	54.1	119.3	Dyar n.p.
New Mexico	1949–50	15 to 16	30	159.0	62.6	49.8	109.7	Lantz n.p.
Arizona	1940–47	15 to 16	23	165.4	65.1	54.2	119.5	Thompson 1948
Utah	(1931–35)	15±½	1,024	160.5	63.2	49.6	109.4	Brown 1936
Utah	1950–51	15 to 16	12	162.8	64.1	55.1	121.5	Wilcox n.p. (a)
Washington	1951–52	15 to 16	72	161.8	63.7	54.8	120.8	Esselbaugh n.p.
Oregon	1947–48	15 to 16	142	160.5	63.2	54.8	120.8	Storvick n.p.
California	1923	15.0	9	162.6	64.0	58.1	128.0	Baldwin 1925b
California	1931–47	15.0	70	164.9	64.9	57.8	127.4	Tuddenham 1954
California	1936–38	15±½	4,689	161.0	63.4	52.5	115.8	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West	(1926–30)	15±½	96	163.0	64.2	54.5	120.2	Gray 1931
N. C. and West (5 States)	1937–39	15 to 16	3,991	160.5	63.2	51.8	114.2	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 31a.—*Standards used for 15-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	Inches	Kilograms	Pounds	
Baldwin-Wood	Short	152	60	47.6	105	Baldwin 1923
	Medium	160	63	52.6	116	
	Tall	168	66	56.7	125	
Stuart-Meredith	10th percentile	155.2	61.1	44.2	97.4	Stuart 1946b
	25th percentile	157.7	62.1	47.7	105.1	
	50th percentile	161.1	63.4	51.5	113.5	
	75th percentile	164.9	64.9	56.2	123.9	
	90th percentile	168.1	66.2	62.6	138.1	

Origin of data—region and State	Date of study[1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1948–51	16±½	52	159.8	62.9	52.3	115.4	Clayton n.p.
Massachusetts	1922–31	16 to 17	275	159.3	62.7	53.8	118.6	Wilson 1935
Massachusetts	1922–34	16±¼	665	158.8	62.5	53.2	117.4	Shuttleworth 1939
Massachusetts	1931–33	16 to 17	20	166.0	65.4	61.0	134.5	Talbot 1937
Rhode Island	1948–51	16±½	37	161.8	63.7	58.0	127.9	Tucker n.p.
New York	1920	16 to 17	9	158.3	62.2	54.1	119.3	Benedict 1921
New York	1926–31	16 to 17	5	161.0	63.4	54.2	119.5	Topper 1932
New York	1948–51	16±½	9	160.5	63.2	53.1	117.1	Young n.p.
North Central:								
Ohio	1926–27	16±½	20	160.0	63.0	53.0	116.8	McKay 1930
Ohio	1931–42	16.0	107	165.5	65.2	58.9	129.8	Simmons 1944
Illinois	(1930–36)	16.0	268	163.3	64.3	54.9	121.0	Richey 1937
Michigan	1954	16±½	184	162.3	63.9	56.5	124.5	Martin 1955
Iowa	1920–27	16±½	71	160.4	63.1	53.2	117.3	Meredith 1941a
Iowa	1920–35	16±½	183	161.4	63.5	54.4	119.9	Boynton 1936
Iowa	1923–27	16±½	65	160.1	63.0	51.5	113.6	Baldwin 1930
Iowa	1930–37	16±½	175	162.5	64.0	54.3	119.7	Meredith 1941a
Iowa	1948–51	16 to 17	37	160.5	63.2	57.2	126.1	Eppright 1954
Southern:								
Maryland	1937–40	16 to 17	319	159.4	62.8	53.3	117.6	Wolff 1941, 1942
Virginia	1944–47	16±½	15	160.5	63.2	51.4	113.3	Dean 1955
Tennessee	1932	16(±½)	21	158.5	62.4	48.8	107.6	Wheeler 1933
Western:								
Montana	1951–52	16 to 17	8	165.1	65.0	54.1	119.2	Odland n.p.
Idaho	1951	16 to 17	71	162.6	64.0	57.0	125.7	Warnick n.p.
Colorado	1949–50	16 to 17	19	159.8	62.9	54.3	119.8	Dyar n.p.
New Mexico	1949–50	16 to 17	43	159.5	62.8	50.6	111.6	Lantz n.p.
Arizona	1940–47	16 to 17	24	165.9	65.3	55.3	121.9	Thompson 1948
Utah	1950–51	16 to 17	18	163.1	64.2	50.8	111.9	Wilcox n.p. (a)
Washington	1951–52	16 to 17	17	164.6	64.8	55.6	122.5	Esselbaugh n.p.
Oregon	1947–48	16 to 17	122	162.3	63.9	57.7	127.3	Storvick n.p.
California	1931–47	16.0	70	165.8	65.3	59.7	131.6	Tuddenham 1954
California	1936–38	16±½	4,761	161.8	63.7	53.4	117.8	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West	(1926–30)	16±½	86	162.9	64.1	55.7	122.8	Gray 1931
N. C. and West (5 States)	1937–39	16 to 17	3,329	161.1	63.4	52.9	116.7	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 32a.—*Standards used for 16-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	155	61	50.8	112	Baldwin 1923
	Medium	163	64	54.4	120	
	Tall	170	67	60.3	133	
Stuart-Meredith	10th percentile	156.1	61.5	45.8	100.9	Stuart 1946b
	25th percentile	158.6	62.4	49.2	108.4	
	50th percentile	162.2	63.9	53.1	117.0	
	75th percentile	165.7	65.2	57.7	127.2	
	90th percentile	169.0	66.5	64.0	141.1	

Origin of data— region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centimeters*	*Inches*	*Kilograms*	*Pounds*	
Northeast:								
Maine	1948–51	17±1/2	16	159.8	62.9	55.2	121.7	Clayton n.p.
Massachusetts	1922–34	17±1/4	553	159.3	62.7	54.2	119.5	Shuttleworth 1939
Massachusetts	1931–33	17 to 18	15	165.2	65.0	59.7	131.6	Talbot 1937
Rhode Island	1948–51	17±1/2	24	163.8	64.5	58.2	128.3	Tucker n.p.
New York	1920	17 to 18	6	166.0	65.4	55.7	122.8	Benedict 1921
New York	1940–55	17 to 18	5	166.4	65.5	60.3	132.6	Taylor n.p.
North Central:								
Ohio	1931–42	17.0	65	165.4	65.1	61.0	134.4	Simmons 1944
Illinois	(1930–36)	17.0	193	163.1	64.2	55.0	121.3	Richey 1937
Michigan	1954	17±1/2	156	162.8	64.1	57.1	125.8	Martin 1955
Iowa	1920–27	17±1/2	74	161.1	63.4	53.9	118.8	Meredith 1941a
Iowa	1920–35	17±1/2	166	161.4	63.5	54.3	119.7	Boynton 1936
Iowa	1923–27	17±1/2	48	161.3	63.5	54.3	119.8	Baldwin 1930
Iowa	1930–37	17±1/2	158	162.8	64.1	55.2	121.7	Meredith 1941a
Iowa	1948–51	17 to 18	26	162.5	64.0	57.5	126.8	Eppright 1954
Southern:								
Maryland	1937–40	17 to 18	193	160.7	63.3	53.9	118.8	Wolff 1941, 1942
Virginia	1944–47	17±1/2	10	162.1	63.8	53.6	118.2	Dean 1955
Tennessee	1932	17(±1/2)	16	158.9	62.6	50.8	112.0	Wheeler 1933
Western:								
Montana	1950–51	17 to 18	29	165.4	65.1	60.7	133.9	Odland n.p.
Idaho	1951	17 to 18	7	161.5	63.6	54.4	120.0	Warnick n.p.
Arizona	1940–47	17 to 18	25	166.4	65.5	56.6	124.8	Thompson 1948
California	1931–47	17.0	70	166.2	65.4	60.1	132.5	Tuddenham 1954
California	1936–38	17±1/2	3,482	162.1	63.8	54.1	119.2	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West	(1926–30)	17±1/2	86	163.9	64.5	57.0	125.7	Gray 1931
N. C. and West (5 States)	1937–39	17 to 18	2,115	161.1	63.4	53.3	117.5	O'Brien 1941

[1] Dates in parentheses are estimated.

TABLE 33a.—*Standards used for 17-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centimeters	*Inches*	*Kilograms*	*Pounds*	
Baldwin-Wood	Short	155	61	51.3	113	} Baldwin 1923
	Medium	163	64	55.3	122	
	Tall	170	67	60.3	133	
Stuart-Meredith	10th percentile	156.3	61.5	46.6	102.8	} Stuart 1946b
	25th percentile	159.0	62.6	50.1	110.4	
	50th percentile	162.5	64.0	54.0	119.1	
	75th percentile	166.1	65.4	58.8	129.6	
	90th percentile	169.4	66.7	65.0	143.3	

TABLE 34.—EIGHTEEN-YEAR-OLD GIRLS: *Heights and weights for region, State, and date of study*

Origin of data—region and State	Date of study [1]	Age when measured	Cases	Height		Weight		First author and date of publication
		Years	*Number*	*Centi-meters*	*Inches*	*Kilo-grams*	*Pounds*	
Northeast:								
Massachusetts	1922–34	18±¼	240	159.6	62.8	54.7	120.7	Shuttleworth 1939
Massachusetts	1931–33	18 to 19	5	162.8	64.1	55.5	122.4	Talbot 1937
New York	1940–55	18 to 19	5	165.2	65.0	58.9	129.6	Taylor n.p.
North Central:								
Michigan	1954	18±½	131	163.6	64.4	57.5	126.8	Martin 1955
Iowa	1920–35	18±½	111	161.0	63.4	54.6	120.4	Boynton 1936
Iowa	1923–27	18±½	35	161.3	63.5	56.1	123.7	Baldwin 1930
Iowa	1948–51	18 to 19	12	163.2	64.2	54.1	119.2	Eppright 1954
Southern:								
Maryland	1940	18 to 19	88	160.1	63.0	54.1	119.2	Wolff 1941, 1942
Western:								
California	1931–47	18.0	70	166.6	65.6	59.8	131.8	Tuddenham 1954
California	1936–38	18±½	1,716	161.8	63.7	54.3	119.6	Lloyd-Jones 1940, 1941
General Regional:								
N. E., N. C., West	(1926–30)	18±½	51	163.7	64.4	57.4	123.5	Gray 1931

[1] Dates in parentheses are estimated.

TABLE 34a.—*Standards used for 18-year-old girls*

Standard	Classification	Height		Weight		First author and date of publication
		Centi-meters	*Inches*	*Kilo-grams*	*Pounds*	
Baldwin-Wood	Short	155	61	52.6	116	} Baldwin 1923
	Medium	163	64	55.8	123	
	Tall	170	67	61.2	135	
Stuart-Meredith	10th percentile	156.3	61.5	46.9	103.5	} Stuart 1946b
	25th percentile	159.0	62.6	50.4	111.2	
	50th percentile	162.5	64.0	54.4	119.9	
	75th percentile	166.1	65.4	59.3	130.8	
	90th percentile	169.4	66.7	65.5	144.5	

Section II.—Selected Height-Weight "Standards"

So-called standards are usually sets of average or smoothed average values for height and weight for age, covering measurements of defined but somewhat limited population groups. A number of forms have been suggested as standards through the years, on the basis of data from various areas of the United States. Among them are the following:

1. Single values for weight and for height for age, reported by:
   a. Hastings (1902), based on data from Omaha, Nebr.
   b. Woodbury (1921), from nationwide coverage, ages 1 through 6 years only.
   c. Gray and Ayres (1931), from 5 States— Massachusetts, New York, Pennsylvania, Illinois, and California.
   d. Peatman and Higgons (1938), from Rye, N. Y.; Westchester County, N. Y.; and Greenwich, Conn.; ages 1 through 5 years only.
   e. McCloy (1938), from Iowa City, Iowa.
   f. Sontag and Reynolds (1945), from Antioch, Ohio.
   g. Martin (1955), from southern Michigan.

2. Single weights for a series of heights for age by:
   a. Baldwin-Wood (1923), based on data from 12 schools in Eastern and North Central States.

3. A range of weights for a series of heights for age by:
   a. Faber (1929), based on data from San Francisco, Calif.

4. Percentile values for weight and for height for age, by:
   a. Grandprey (1933), from Woodbury (1921) data.

b. Stuart-Meredith (1946b), based on data from Iowa City, Iowa.
c. Meredith (1949), based on different percentiles from Iowa City data.
d. Boyd (1952), from Denver, Colo.

The large number of suggested standards published since Baldwin-Wood's popular tables of 1923 illustrates the fact that no single set of standards seems satisfactory for all groups of children. Marked variation is found in the average size of groups of children from different geographic areas, owing in part at least to variation in such factors as national background, socioeconomic status, and climate. Some illustrations of this variation are given in Section III.

It must be emphasized that the averages and standards published in this handbook are for *groups*, not for individuals, and that even in small groups the individual growth trends differ. Judging growth of an individual on the basis of a few measurements in relation to group standards can lead to erroneous conclusions regarding his physical status. His own height-weight record kept over the years affords a much more substantial basis for his growth trends.

A group of eight standards and the basis used in their preparation have been selected for presentation in this compilation.

Hasting's tables (1902)

Hasting's (1902) data, summarized in table 35, were based on measurements of about 8,000 boys and 7,000 girls, aged 5 to 20—school children in Omaha, Nebr., in 1899. Baldwin in 1921 considered them as "the best summary from the anthropometric standpoint so far published." They have received little publicity and are presented here because of historical interest, and for comparison with more recent standards.

TABLE 35.—*Hastings (1902)—Height and weight for age—boys and girls*

Age (years)	Boys				Girls			
	Height		Weight		Height		Weight	
	Centi- meters	Inches	Kilo- grams	Pounds	Centi- meters	Inches	Kilo- grams	Pounds
5	105.8	41.6	17.9	39.3	105.4	41.5	17.3	38.2
6	110.7	43.6	19.4	42.6	109.9	43.2	18.5	40.8
7	115.7	45.6	21.3	46.8	115.0	45.7	20.7	45.6
8	121.3	47.8	23.1	50.9	120.2	47.3	22.2	48.9
9	125.9	49.6	25.1	55.2	126.2	49.7	24.9	54.9
10	131.0	51.6	27.9	61.3	131.3	51.7	27.2	59.9
11	134.9	53.1	29.9	64.9	135.2	53.2	29.0	63.9
12	140.3	55.2	33.0	72.6	142.0	55.9	33.1	72.7
13	145.1	57.1	35.6	78.3	148.5	58.5	37.9	83.5
14	151.0	59.4	39.7	87.4	153.2	60.3	42.9	94.4
15	158.2	62.2	47.0	103.3	156.8	61.8	46.7	102.8
16	163.7	64.4	52.9	116.4	157.9	62.2	50.4	110.8
17	170.0	66.9	56.8	125.0	159.4	62.8	50.4	110.8
18	171.1	67.4	59.2	130.2	159.7	62.9	50.2	110.4
19	171.8	67.6	61.7	135.7	160.1	63.0	51.4	113.1
20	172.2	67.8	61.1	134.4	160.8	63.3	52.3	115.1

Baldwin-Wood tables (1923, 1925)

In 1923 Baldwin and Wood published height-weight-age tables in English units for boys and for girls of school age (5 to 19 years) from records of 74,000 boys and 55,000 girls from 12 schools in the North-eastern and North Central States. They are presented as tables 36 and 37. In them, age is reported at the nearest birthday, height at the nearest inch, and weight at the nearest pound. Actual averages are in round numbers; smoothed or extrapolated values are represented by starred figures. The following percentages of net weights were added for clothing (shoes, coats, and sweaters were not included): For boys, 3.5 percent for weights from 35 to 63 pounds and 4 percent for 64 pounds and over; for girls, 3 percent was added for weights from 35 to 65 pounds, 2.5 percent for weights from 66 to 82 pounds, and 2 percent for 83 pounds and over.

In 1925 Baldwin published the equivalent nude weights for height and age in metric units translated and extended from the Baldwin-Wood tables—tables 38 and 39 in this compilation. The height was taken at the nearest centimeter, and the weight at the nearest tenth of a kilogram.

Table 36.—Baldwin and Wood (1923)—Weight-height-age table for boys of school age [1][2]

Height (inches)	5 years	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years	15 years	16 years	17 years	18 years	19 years	Average weight for height (lbs.)
38	34	*31														34
39	35	35														35
40	36	*36														36
41	38	38	*38	*39												38
42	39	39	*39	*41												39
43	41	41	*41	44												41
44	44	44	44	44												44
45	46	46	46	*46	*46											46
46	*47	48	48	48	*48											48
47	*49	50	50	50	*50	*50										50
48		52	53	53	53	*53										53
49		55	55	55	55	55	*55									55
50		*57	58	58	58	58	*58	*58								58
51			61	61	61	61	61	*61								61
52			63	64	64	64	64	64	*64							64
53			*66	67	67	67	67	68	*68							68
54				70	70	70	70	71	71	*72						71
55				*72	72	73	73	74	74	*74						74
56				*75	76	77	77	77	78	78	*80					78
57					*79	80	81	81	82	83	*83					82
58					*83	84	84	85	85	86	87					85
59						87	88	89	89	90	90	90				89
60						*91	92	92	93	94	95	96				94
61							95	96	97	99	100	103	*106			99
62							*100	101	102	103	104	107	111	*116		104
63							*105	106	107	108	110	113	118	123	*127	111
64								109	111	113	115	117	121	126	*130	117
65								*114	117	118	120	122	127	131	134	123
66									119	122	125	128	132	136	139	129
67									*124	128	130	134	136	139	142	133
68										134	134	137	141	143	147	139
69										137	139	143	146	149	152	144
70										143	144	145	148	151	155	147
71										*148	150	151	152	154	159	152
72											153	155	156	158	163	157
73											*157	160	162	164	167	163
74											*160	164	168	170	171	169

Age—years		5 years	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Average height (inches)	Short		43	45	47	49	51	53	54	56	58	60	62	64	65	65
	Medium		46	48	50	52	54	56	58	60	63	65	67	68	69	69
	Tall		49	51	53	55	57	59	61	64	67	70	72	72	73	73
Average annual gain (pounds)	Short		3	4	5	5	5	4	8	9	11	14	13	7	3	—
	Medium		4	5	6	6	6	7	9	11	15	11	8	4	3	—
	Tall		5	7	7	7	7	8	12	16	11	9	7	3	4	

[1] As presented in Mother and Child, suppl. to July issue, 1923.

[2] Starred (*) figures represent values based upon theoretical computations, rather than exact averages. Age is taken at the nearest birthday, height at the nearest inch, weight to the nearest pound.

TABLE 37.—*Baldwin and Wood (1923)—Weight-height-age table for girls of school age* [1] [2]

Height (inches)	Average weight for height (lbs.)	5 years	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years	15 years	16 years	17 years	18 years	Height (inches)
38	33	33	33													38
39	34	34	34													39
40	36	36	36	*36												40
41	37	37	37	*37												41
42	39	39	39	*39												42
43	41	41	41	41	*41											43
44	42	42	42	42	*42											44
45	45	45	45	45	45	*45										45
46	47	*47	47	47	48	*48										46
47	50	*49	50	50	50	50	*50									47
48	52		52	52	52	52	*53	*53								48
49	55		54	54	55	55	56	*56								49
50	58		*56	56	57	58	59	61	*62							50
51	61			59	60	61	61	63	65							51
52	64			*63	64	64	64	65	67	*71						52
53	68			*66	67	67	68	68	69	*73						53
54	71				69	70	70	71	71							54
55	75				*72	74	74	74	75	77	*78					55
56	79					76	78	78	79	81	*83					56
57	84					*80	82	82	82	84	88	*92				57
58	89						84	86	86	88	93	*96	*101			58
59	95						87	90	90	92	96	100	*103	*104		59
60	101						*91	95	95	97	101	105	108	109	*111	60
61	108							99	100	101	105	108	112	113	116	61
62	114							*104	105	106	109	113	115	117	118	62
63	118								110	110	112	115	117	119	120	63
64	121								*114	115	117	119	120	122	123	64
65	125								*118	120	121	122	123	125	126	65
66	129									124	124	125	128	129	130	66
67	133									*128	130	131	133	133	135	67
68	138									*131	133	135	136	138	138	68
69	142										*135	*137	*138	*140	*142	69
70	144										*136	*138	*140	*142	*144	70
71	145										*138	*140	*142	*144	*145	71

Age—years		6	7	8	9	10	11	12	13	14	15	16	17	18
Average height (inches)	Short	43	45	47	49	50	52	54	57	59	60	61	61	61
	Medium	45	47	50	52	54	56	58	60	62	63	64	64	64
	Tall	47	50	53	55	57	59	62	64	66	66	67	67	67
Average annual gain (pounds)	Short	4	4	4	5	6	6	10	13	10	7	2	1	
	Medium	5	5	6	7	8	10	13	10	6	4	3	1	
	Tall	6	8	8	9	11	13	9	8	4	4	1	1	

[1] As presented in Mother and Child, suppl. to July issue, 1923.
[2] Starred (*) figures represent values based upon theoretical computations, rather than exact averages. Age is taken at the nearest birthday, height at the nearest inch, weight to the nearest pound.

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Table 38.—Baldwin (1925)—Weight-height-age standards for boys of school age [1]

| Height (centimeters) | Weight (kilograms) | | | | | | | | | | | | | |
	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years	15 years	16 years	17 years	18 years	19 years
97	*15.0													
98	*15.1													
99	*15.3													
100	*15.5													
101	*15.7													
102	*15.9													
103	*16.1													
104	16.6													
105	16.8	*16.8												
106	17.0	*17.0												
107	17.2	*17.2	*17.2											
108	17.5	*17.6	*17.4											
109	17.8	*17.9	*17.7											
110	18.3	*18.4	*18.2											
111	18.9	*18.9	*18.8											
112	19.4	19.4	*19.4											
113	19.7	19.7	*19.7											
114	20.0	20.0	*20.0											
115	20.4	20.4	*20.4	*20.3										
116	20.7	20.8	20.6	*20.6										
117	21.1	21.2	21.1	*21.2										
118	21.5	21.5	21.4	*21.4										
119	21.9	21.9	21.8	*21.7										
120	22.3	22.4	22.2	*22.2	*22.2									
121	22.5	22.8	22.7	*22.7	*22.7									
122	22.9	23.2	23.1	23.2	*23.2									
123	23.4	23.5	23.6	23.6	*23.5									
124	23.9	23.8	24.1	24.0	*23.8									
125	24.3	24.3	24.5	24.4	24.2	*24.4								
126	*24.6	24.9	24.9	24.9	24.8	*24.9								
127	*25.0	25.3	25.3	25.3	25.4	*25.4	*25.4							
128		25.9	25.9	25.7	25.9	25.9	*25.9							
129		26.4	26.5	26.2	26.4	26.4	*26.4							
130		26.9	27.0	26.7	26.8	27.0	*26.9							
131		27.2	27.4	27.3	27.3	27.5	*27.3							
132		27.5	27.9	27.8	27.8	28.0	27.7							
133		*28.0	28.4	28.4	28.3	28.5	28.3	*28.5						
134		*28.5	28.9	28.9	28.8	28.9	29.0	*29.3						
135			29.4	29.4	29.3	29.4	29.6	*29.9						
136			30.0	29.9	29.7	29.8	30.3	*30.3						
137			30.6	30.4	30.2	30.2	30.9	*30.7						
138			*30.9	30.8	30.9	30.8	31.3	31.2	*31.7					
139			*31.2	31.1	31.5	31.5	31.9	31.8	*32.0					

Height (centimeters)
97
98
99
100
101
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103
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138
139

Height	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
140	*31.6	31.6	32.2	32.2	32.4	32.4	*32.5					
141	*32.1	32.3	32.9	32.8	32.9	33.2	*33.1					
142	*32.6	33.1	33.7	33.5	33.4	34.0	*33.7					
143		*33.6	34.1	34.2	34.1	34.7	34.5	*35.3				
144		*34.1	34.4	35.0	34.7	35.2	35.5	*35.8				
145		*34.6	34.9	35.7	35.4	35.8	36.3	*36.3				
146		*35.3	35.7	36.2	36.2	36.5	36.9	*37.0				
147		*36.0	36.5	36.7	36.9	37.1	37.4	*37.7				
148			37.0	37.2	37.6	37.8	38.0	38.2				
149			37.5	37.8	38.2	38.4	38.6	38.7				
150			38.1	38.5	39.0	39.1	39.3	39.3	39.2			
151			*38.7	39.2	39.5	39.7	40.0	40.3	40.3			
152			*39.4	39.9	40.0	40.3	40.7	41.3	41.5			
153				40.5	40.6	41.1	41.6	42.1	42.6			
154				41.0	41.4	41.9	42.5	42.8	43.7			
155				41.5	42.1	42.7	43.4	43.5	44.8	*46.3		
156				*42.3	42.9	43.4	44.0	44.2	45.5	*47.2		
157				*43.2	43.8	44.1	44.7	44.9	46.3	48.1		
158				*44.0	44.6	44.9	45.5	45.8	47.3	49.2	*51.3	
159				*44.9	45.4	45.8	46.4	46.9	48.6	50.3	*52.6	
160				*45.8	46.2	46.7	47.4	48.0	49.8	51.5	53.9	*55.4
161					47.4	47.3	48.1	48.8	50.2	52.0	54.4	*55.9
162					48.7	48.0	48.8	49.6	50.6	52.5	54.9	*56.4
163					49.4	48.8	49.6	50.5	51.2	53.2	55.5	*57.0
164					*49.6	49.9	50.5	51.4	52.1	54.1	56.3	*57.7
165					*49.7	50.9	51.4	52.3	53.1	55.1	57.1	58.3
166						51.4	52.1	53.2	54.1	56.1	57.9	59.3
167						51.8	52.9	54.0	55.1	57.0	58.7	60.3
168						52.3	53.7	54.8	56.1	57.8	59.4	61.0
169						*53.1	54.7	55.7	57.1	58.5	60.0	61.4
170						*53.9	55.6	56.5	58.1	59.1	60.5	61.7
171							56.7	57.3	58.8	59.9	61.2	62.5
172							57.8	58.0	59.5	60.9	62.0	63.4
173							58.7	58.7	60.2	61.8	62.8	64.2
174							59.2	59.6	61.1	62.7	63.8	65.1
175							59.7	60.4	61.9	63.5	64.7	65.9
176							60.5	61.2	62.5	64.0	65.3	66.5
177							61.4	62.0	62.9	64.3	65.7	67.2
178							62.4	62.8	63.4	64.7	66.1	67.8
179							*63.3	63.9	64.5	65.4	66.6	68.4
180							*64.2	65.1	65.7	66.1	67.1	68.8
181								65.8	66.4	66.7	67.7	69.6
182								66.3	67.0	67.3	68.3	70.4
183								66.9	67.6	68.0	69.0	71.2
184								67.5	68.6	69.1	70.1	71.8
185								*68.2	69.5	70.3	71.3	72.5
186								*68.8	70.3	71.3	72.2	73.2
187								*69.3	71.0	72.3	73.1	73.8
188								*69.8	71.7	73.3	73.9	74.4

¹ Starred (*) figures represent values based upon theoretical computations, rather than on exact averages. Age is taken at the nearest birthday, height at the nearest centimeter, weight at the nearest tenth of a kilogram. Translated and extended from the Baldwin-Wood tables in the English system of measurement by B. T. Baldwin, Ph.D. Issued by the Iowa Child Welfare Research Station, State University of Iowa, Iowa City, Iowa, September 1924.

Table 39.—Baldwin (1925)—Weight-height-age standards for girls of school age [1]

Weight (kilograms)

Height (centimeters)	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years	14 years	15 years	16 years	17 years	18 years	Height (centimeters)
100	15.3													100
101	15.7													101
102	16.0	*16.0												102
103	16.1	*16.1												103
104	16.3	*16.3												104
105	16.6	*16.6												105
106	16.8	*16.8												106
107	17.1	17.1												107
108	17.6	17.5												108
109	18.0	17.8												109
110	18.2	18.1	*18.2											110
111	18.4	18.5	*18.4											111
112	18.6	18.8	*18.6											112
113	19.2	19.3	*19.1											113
114	19.7	19.8	*19.7											114
115	20.2	20.1	20.2	*21.2	*21.2									115
116	20.6	20.3	20.8	*21.5	*21.5									116
117	21.0	20.5	21.3	*21.9	*21.9									117
118	21.4	21.1	21.5											118
119	21.8	21.8	21.8											119
120	22.3	22.3	22.2	*22.3	*22.3	*23.4								120
121	22.7	22.7	22.7	*22.7	*22.9	*23.7								121
122	23.1	23.1	23.1	23.2	23.4	*24.0								122
123	23.3	23.4	23.5	23.6	23.8									123
124	23.4	23.7	23.8	24.2	24.1									124
125	23.7	24.1	24.3	24.7	24.6	*24.7								125
126	*24.2	24.4	24.8	25.2	25.3	*25.8								126
127	*24.7	24.8	25.4	25.8	26.0	26.9	*27.3							127
128		25.2	25.8	26.2	26.4	27.2	*27.1							128
129		25.7	26.2	26.6	26.7	27.5	26.9							129
130		*26.3	26.7	27.0	27.1	27.9	27.3							130
131		*27.1	27.4	27.5	27.7	28.2	28.4							131
132		*27.8	28.1	28.0	28.2	28.6	29.5							132
133		*28.4	28.6	28.6	28.8	29.1	29.9							133
134		*28.9	29.1	29.2	29.5	29.6	30.3							134
135			29.6	29.8	30.1	30.1	30.7	*31.5						135
136			30.0	30.4	30.5	30.7	31.0	*31.9						136
137			30.4	31.0	31.0	31.3	31.4	*32.2						137
138			*30.9	31.6	31.6	31.9	32.0	*32.8						138
139			*31.4	32.3	32.3	32.5	32.6	*33.4						139

Height										
140	32.9	32.9	33.1	33.2	34.1	*34.8				
141	33.3	33.6	33.7	34.0	34.9	*35.6				
142	33.6	34.4	34.3	34.8	35.8	*36.5				
143	*34.2	35.1	35.0	35.5	36.3	*37.4				
144	*34.9	35.9	35.6	36.0	36.7	*38.4				
145		36.6	36.4	36.6	37.2	39.3	*41.1			
146		36.8	37.3	37.3	38.0	40.3	*42.0			
147		37.1	38.2	37.9	38.8	41.4	*42.8			
148		37.6	38.9	38.6	39.5	42.0	*43.5	*45.1		
149		38.2	39.5	39.2	40.3	42.5	*44.0	*45.5		
150		38.8	40.2	39.9	41.1	43.0	44.6	*45.9	*46.4	
151		*39.5	41.0	40.8	41.9	43.8	45.5	*46.8	*47.3	
152		*40.2	41.8	41.7	42.7	44.6	46.4	*47.7	48.1	
153			42.6	42.7	43.5	45.4	47.1	48.6	48.9	*49.9
154			43.4	43.8	44.2	46.2	47.6	49.4	49.7	*50.7
155			44.2	44.8	45.0	47.0	48.1	50.2	50.4	51.4
156			*44.1	45.5	45.7	47.5	48.9	50.7	51.1	51.7
157			*44.0	46.2	46.5	48.1	49.8	51.1	51.8	52.0
158				47.0	47.4	48.7	50.5	51.4	52.2	52.4
159				47.9	48.3	49.2	51.0	51.7	52.5	52.7
160				48.9	49.2	49.8	51.5	51.9	52.8	53.1
161				*49.6	49.9	50.7	52.1	52.6	53.3	53.6
162				*50.3	50.6	51.5	52.7	53.2	53.7	54.0
163				*51.0	51.4	52.3	53.3	53.8	54.2	54.6
164				*51.7	52.2	53.2	53.7	54.3	54.8	55.3
165				*52.4	53.1	54.0	54.2	54.8	55.4	55.9
166					54.0	54.5	54.6	55.7	56.1	56.6
167					54.9	54.9	55.0	56.6	56.9	57.4
168					*55.6	55.5	55.7	57.4	57.6	58.2
169					*56.2	56.6	56.9	58.2	58.2	59.2
170					*56.8	57.6	58.0	58.9	58.9	60.1
171					*57.2	58.2	58.8	59.5	59.7	60.7
172					*57.8	58.7	59.5	60.0	60.7	61.1
173						59.1	60.1	60.5	61.4	61.6
174						*59.6	*60.5	*60.9	*61.8	*62.3
175						*60.0	*60.8	*61.2	*62.1	*62.9
176						*60.2	*61.0	*61.6	*62.5	*63.4
177						*60.4	*61.2	*62.0	*62.8	*63.7
178						*60.6	*61.5	*62.4	*63.2	*64.0
179						*60.9	*61.8	*62.7	*63.5	*64.2
180						*61.3	*62.2	*63.0	*63.9	*64.4

Bayer-Gray Charts (1935)

The Bayer-Gray charts, illustrated in figures 2a and 2b[1] are probably the earliest ones still in use. They are based on Gray-Ayres' 1931 data for American-born children of north European stock having better than average living conditions. Small circles, plotted for height and weight, and labeled for age can be compared with the height bar for age, and with the weight position in the open stream. A line joining the circles will give growth over a period of time.

An additional check on the relation of an individual's values with the average is possible by use of bicristal diameter measurements. The average bicristal values corresponding to average weights are also indicated on the horizontal axis. If small crosses are plotted for height and bicristal diameter, relation of the weight to expected weight can be observed. The circles and crosses should not be more than one-half an area apart.

[1] Published with permission of Leona Bayer and the American Journal of Diseases of Children. Supplies of the Bayer-Gray charts can be purchased from Leona Bayer at the Stanford University School of Medicine, 2398 Sacramento Street, San Francisco 15, Calif.

Wetzel grid (1941)

In 1941 Wetzel introduced his grid,[2] a chart for recording growth progress of individual boys and girls. The grid uses height-weight-age data to provide an appraisal of physique or body build, developmental level, nutritional grade, physical status, relative age advancement or retardation, state of maturation, basal heat requirement, and caloric needs. The grid is based on laws of physics and development and application of mathematical formulas to interpret these laws in terms of growth. It was planned primarily for use in schools or health centers. Detailed explanation of the use of the grid is presented in various publications (Wetzel 1941, 1943, 1944). The accompanying illustration of the grid with an example of a growth record of a normal boy (fig. 3) was furnished by Wetzel for use in this publication along with the following information regarding the boy's development:

> This record is a "long-term" example of overall good growth; both the channel course (ABC) and the auxodrome (1–2–3) responding promptly to such minor deviations as they show. Shortly after B, he had to be placed in a foster home owing to family distress and remained under institutional care for 2 years. He resumed normal family residence following 2. At C and 3, he excelled in competitive science examinations. He has also excelled in swimming and hockey, as one might expect from his consistent A_1A_2 pattern.

[2] Copies of the grid and details of its use are available from NEA Service Inc., 1200 West 3d Street, Cleveland, Ohio.
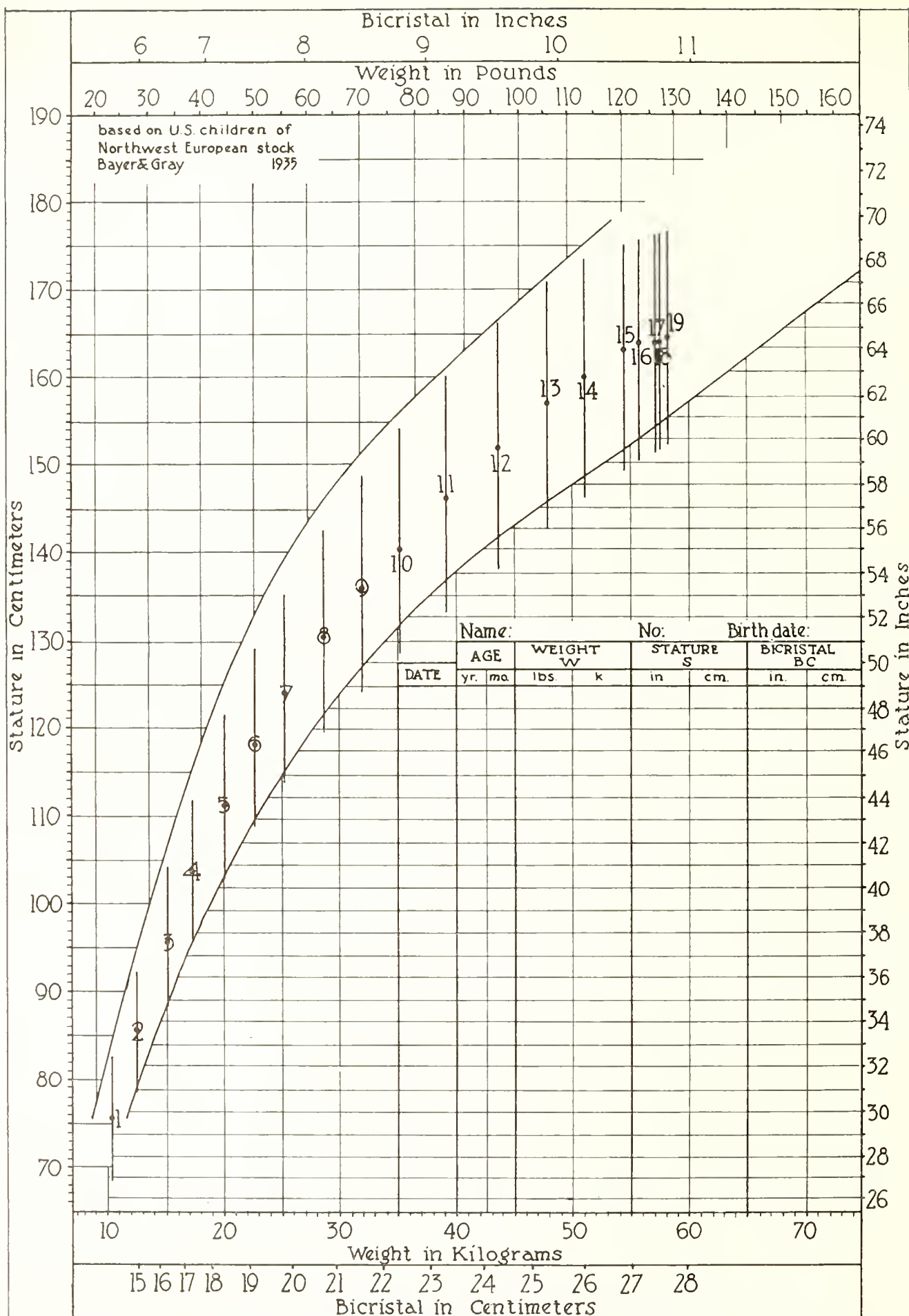
Figure 2a.—Bayer-Gray growth chart for boys, aged 1 to 19 years.

The chart axes and labels read:

- Top: Bicristal in Inches (6, 7, 8, 9, 10, 11)
- Weight in Pounds (20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160)
- Left: Stature in Centimeters (70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190)
- Right: Stature in Inches (26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74)
- Bottom: Weight in Kilograms (10, 20, 30, 40, 50, 60, 70)
- Bottom: Bicristal in Centimeters (16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28)

Annotation within the chart: based on U.S. children of Northwest European stock, Bayer & Gray 1935

Table within chart:

DATE	AGE yr.	mo.	WEIGHT W lbs.	k.	STATURE S in.	cm.	BICRISTAL BC in.	cm.

Name: No: Birth date:

Figure 2b.—Bayer-Gray growth chart for girls, aged 1 to 19 years.

Figure 3.—Wetzel grid record of growth of a normal boy.

Jackson-Kelly charts (1943)

The Jackson-Kelly charts are based on 13,500 height and 11,100 weight measurements of Iowa City children. The data were collected from 1920 to 1940 and compiled by Meredith at the Iowa Child Welfare Research Station. The charts were copyrighted by the State University of Iowa in 1943, and information concerning them was published later (Jackson and Kelly 1945). The data are similar to, but not identical with, those in the Stuart-Meredith 1946 tables and charts. The Jackson-Kelly charts give median, 16th, and 84th percentiles for weights and mean and mean $\pm$ 1 standard deviation for heights, while the tables and charts by Stuart and Meredith (1946) and by Meredith (1949) use percentiles for both measurements.

Copies of the Jackson-Kelly preschool and school charts are presented here, as figures 4a through 4d.[3]

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[3] Published with permission of the Department of Publications, State University of Iowa, and the Journal of Pediatrics. Supplies of the charts can be purchased from the Department of Pediatrics at The State University of Iowa, Iowa City, Iowa.

Weight – Age Values
Median, 16ᵗʰ and 84ᵗʰ percentile

BOYS

Height – Age Values
Mean, Mean ± I SD

Name

No.

Birth Date

Date	Age	Height	Weight

FORM
137–B PREPARED FROM DATA COMPILED BY IOWA CHILD WELFARE RESEARCH STATION

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Figure 4a.—Jackson-Kelly growth chart for boys, aged 0 to 6 years.

Figure 4b.—Jackson-Kelly growth chart for girls, aged 0 to 6 years.

Figure 4c—Jackson-Kelly growth chart for boys, aged 5 to 18 years.

Figure 4d.—Jackson-Kelly growth chart for girls, aged 5 to 18 years.

Stuart-Meredith tables (1946)

In 1946 Stuart and Meredith published data on heights (in centimeters) and weights (in pounds) of school children, aged 5 through 18 years. These data, collected between 1930 and 1945, were based on 3,771 measurements of several hundred Iowa City children of northwest European ancestry attending the University of Iowa experimental schools. Boys and younger girls were measured in light socks and shorts, older girls in light socks, shorts, and brassieres. Data[4] for boys and girls are presented in tables 40 and 41 for the five percentiles used in the original tables, but in both metric and English units. Half-year values, originally derived by interpolation, have been omitted. Charts based on these data were presented in the 1946 publication.

NEA-AMA data (1949)

Charts[5] for plotting the physical growth of girls and of boys were prepared by the joint committee on Health Problems in Education of the National Education Association and American Medical Association, from data prepared by H. V. Meredith, State University of Iowa. A report on them was published by Meredith in 1949. These charts, like the Wetzel grid, were planned for use in following the growth of individuals. They are based on the 10th, 30th, 70th, and 90th percentiles from the same Iowa children used for the Stuart-Meredith tables, but are for children in indoor clothing with shoes, coats, and sweaters removed. For this compilation, the data are presented in tables 42 and 43 rather than in charts. Values in English units were taken from table 8, page 129, of Martin's "Roberts' Nutrition Work with Children,"[6] and metric units were calculated from them.

[4] Copyrighted 1946 by the American Journal of Public Health, and published with their permission.

[5] Copies of the charts may be procured from the American Medical Association, 535 North Dearborn Street, Chicago 10, Illinois.

[6] Copyrighted 1954 by the University of Chicago; published by the University of Chicago Press; used with their permission.

TABLE 40.—*Stuart-Meredith (1946)—Percentile standards for height and weight for age—boys*

Age (years)	Height percentiles					Weight percentiles				
	10	25	50	75	90	10	25	50	75	90
	Cm.	Cm.	Cm.	Cm.	Cm.	Kg.	Kg.	Kg.	Kg.	Kg.
5	105.3	108.3	111.3	114.2	116.7	16.6	18.0	19.4	21.1	22.5
6	111.2	114.1	117.5	120.8	123.5	18.6	20.1	21.9	23.6	25.6
7	116.9	120.3	124.1	127.6	130.5	20.8	22.5	24.5	26.6	29.2
8	123.1	126.6	130.0	134.2	137.3	23.2	25.2	27.3	29.7	33.1
9	128.3	131.6	135.5	139.8	142.6	25.5	27.7	29.9	32.8	36.7
10	132.8	136.3	140.3	144.4	147.5	27.7	30.1	32.6	36.1	40.8
11	137.3	140.5	144.2	149.2	151.8	30.1	32.5	35.2	39.6	45.0
12	142.4	145.2	149.6	153.5	157.9	32.7	35.2	38.3	43.5	49.7
13	146.6	149.7	155.0	160.8	165.3	35.0	38.0	42.2	48.9	55.9
14	152.1	156.5	162.7	168.4	172.4	39.7	43.3	48.8	55.8	62.1
15	157.8	162.3	167.8	173.0	176.7	45.1	49.1	54.5	61.2	67.0
16	162.8	167.1	171.6	176.6	179.7	50.3	53.8	58.8	65.5	71.4
17	165.5	169.7	173.7	178.1	181.6	53.3	56.5	61.8	68.7	74.7
18	166.3	170.5	174.5	178.9	182.4	54.4	57.7	63.1	70.6	76.7
	Inches	Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds	Pounds
5	41.5	42.6	43.8	45.0	45.9	36.6	39.6	42.8	46.5	49.7
6	43.8	44.9	46.3	47.6	48.6	40.9	44.4	48.3	52.1	56.4
7	46.0	47.4	48.9	50.2	51.4	45.8	49.7	54.1	58.7	64.4
8	48.5	49.8	51.2	52.8	54.1	51.2	55.5	60.1	65.5	73.0
9	50.5	51.8	53.3	55.0	56.1	56.3	61.1	66.0	72.3	81.0
10	52.3	53.7	55.2	56.9	58.1	61.1	66.3	71.9	79.6	89.9
11	54.1	55.3	56.8	58.7	59.8	66.3	71.6	77.6	87.2	99.3
12	56.1	57.2	58.9	60.4	62.2	72.0	77.5	84.4	96.0	109.6
13	57.7	58.9	61.0	63.3	65.1	77.1	83.7	93.0	107.9	123.2
14	59.9	61.6	64.1	66.3	67.9	87.5	95.5	107.6	123.1	136.9
15	62.1	63.9	66.1	68.1	69.6	99.4	108.2	120.1	135.0	147.8
16	64.1	65.8	67.6	69.5	70.7	111.0	118.7	129.7	144.4	157.3
17	65.2	66.8	68.4	70.1	71.5	117.5	124.5	136.2	151.4	164.6
18	65.5	67.1	68.7	70.4	71.8	120.0	127.1	139.0	155.7	169.0

Table 41.—*Stuart-Meredith (1946)—Percentile standards for height and weight for age—girls*

Age (years)	Height percentiles					Weight percentiles				
	10	25	50	75	90	10	25	50	75	90
	Cm.	Cm.	Cm.	Cm.	Cm.	Kg.	Kg.	Kg.	Kg.	Kg.
5	105.0	107.2	109.7	112.9	115.4	16.4	17.5	18.8	20.0	21.9
6	110.6	113.2	115.9	119.3	122.3	18.1	19.5	21.1	22.8	24.6
7	116.8	119.2	122.3	125.9	128.9	20.2	21.8	23.7	25.5	27.8
8	122.1	124.8	128.0	131.6	134.6	22.0	24.1	26.4	28.7	31.7
9	127.0	129.7	132.9	137.1	140.4	23.9	26.3	28.9	32.0	35.9
10	131.7	134.6	138.6	142.6	146.0	25.9	28.5	31.9	35.9	40.7
11	137.0	140.3	144.7	149.2	153.4	28.4	31.7	35.7	40.4	45.5
12	142.6	145.9	151.5	156.6	160.6	31.5	35.4	39.7	44.8	50.6
13	149.1	152.6	157.1	161.5	164.8	36.2	40.6	45.0	50.3	56.5
14	153.0	156.1	159.6	163.7	167.0	41.3	45.3	49.2	54.3	60.5
15	155.2	157.7	161.1	164.9	168.1	44.2	47.7	51.5	56.2	62.6
16	156.1	158.6	162.2	165.7	169.0	45.8	49.2	53.1	57.7	64.0
17	156.3	159.0	162.5	166.1	169.4	46.6	50.1	54.0	58.8	65.0
18	156.3	159.0	162.5	166.1	169.4	46.9	50.4	54.4	59.3	65.5
	Inches	Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds	Pounds
5	41.3	42.2	43.2	44.4	45.4	36.1	38.6	41.4	44.2	48.2
6	43.5	44.6	45.6	47.0	48.1	39.9	42.9	46.5	50.2	54.2
7	46.0	46.9	48.1	49.6	50.7	44.5	48.1	52.2	56.3	61.2
8	48.1	49.1	50.4	51.8	53.0	48.6	53.1	58.1	63.3	69.9
9	50.0	51.1	52.3	54.0	55.3	52.6	57.9	63.8	70.5	79.1
10	51.9	53.0	54.6	56.1	57.5	57.1	62.8	70.3	79.1	89.7
11	53.9	55.2	57.0	58.7	60.4	62.6	69.9	78.8	89.1	100.4
12	56.1	57.4	59.6	61.7	63.2	69.5	78.0	87.6	98.8	111.5
13	58.7	60.1	61.9	63.6	64.9	79.9	89.4	99.1	111.0	124.5
14	60.2	61.5	62.8	64.4	65.7	91.0	99.8	108.4	119.7	133.3
15	61.1	62.1	63.4	64.9	66.2	97.4	105.1	113.5	123.9	138.1
16	61.5	62.4	63.9	65.2	66.5	100.9	108.4	117.0	127.2	141.1
17	61.5	62.6	64.0	65.4	66.7	102.8	110.4	119.1	129.6	143.3
18	61.5	62.6	64.0	65.4	66.7	103.5	111.2	119.9	130.8	144.5

Age (years)	Height percentiles				Weight percentiles			
	10	30	70	90	10	30	70	90
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Kg.*	*Kg.*	*Kg.*	*Kg.*
4	99.1	102.4	106.2	109.2	14.8	16.4	18.3	20.0
5	104.9	108.7	113.0	116.8	16.5	18.2	20.7	22.5
6	111.3	115.7	120.1	124.0	18.4	20.5	23.2	25.6
7	117.3	121.4	126.5	130.6	20.5	22.9	26.0	29.2
8	123.2	127.3	132.6	136.9	23.0	25.4	28.9	33.1
9	128.5	132.6	138.4	142.5	25.3	28.0	31.8	36.8
10	133.4	137.7	143.5	147.3	27.5	30.6	34.9	40.6
11	137.4	141.7	147.6	151.9	29.9	33.5	38.1	44.5
12	141.5	146.0	152.4	157.7	32.6	36.1	41.9	49.4
13	146.3	151.6	159.0	165.1	35.1	39.2	47.1	55.5
14	151.9	158.2	166.6	172.7	39.2	44.5	53.7	62.5
15	158.0	164.3	172.2	177.8	45.2	50.4	60.0	67.9
16	162.8	168.1	175.3	180.8	50.3	55.1	64.2	71.7
17	165.4	170.2	177.0	182.9	53.3	57.7	67.2	74.6
18	166.4	170.9	177.8	183.4	54.4	58.9	69.0	76.7
	Inches	*Inches*	*Inches*	*Inches*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
4	39.0	40.3	41.8	43.0	32.6	36.2	40.3	44.1
5	41.3	42.8	44.5	46.0	36.3	40.3	45.6	49.7
6	43.8	45.5	47.3	48.8	40.5	45.2	51.2	56.4
7	46.2	47.8	49.8	51.4	45.3	50.4	57.4	64.3
8	48.5	50.1	52.2	53.9	50.6	56.1	63.7	72.9
9	50.6	52.2	54.5	56.1	55.7	61.7	70.2	81.1
10	52.5	54.2	56.5	58.0	60.6	67.5	77.0	89.6
11	54.1	55.8	58.1	59.8	66.0	73.8	84.0	98.1
12	55.7	57.5	60.0	62.1	71.9	79.6	92.4	109.0
13	57.6	59.7	62.6	65.0	77.4	86.5	103.8	122.3
14	59.8	62.3	65.6	68.0	86.5	98.2	118.3	137.7
15	62.2	64.7	67.8	70.0	99.7	111.1	132.2	149.6
16	64.1	66.2	69.0	71.2	111.0	121.4	141.6	158.0
17	65.1	67.0	69.7	72.0	117.4	127.2	148.1	164.4
18	65.5	67.3	70.0	72.2	120.0	129.9	152.2	169.0

Age (years)	Height percentiles				Weight percentiles			
	10	30	70	90	10	30	70	90
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Kg.*	*Kg.*	*Kg.*	*Kg.*
4	98.3	101.3	105.2	109.0	13.7	15.5	17.4	19.2
5	104.6	108.2	112.5	115.8	15.8	17.8	19.7	21.9
6	110.5	114.0	118.6	122.4	17.9	19.8	22.4	24.6
7	116.1	119.9	125.0	129.0	20.1	22.2	25.2	27.9
8	121.7	125.7	130.8	134.9	22.1	24.6	28.2	31.7
9	127.0	131.1	136.1	140.5	23.9	26.9	31.2	35.9
10	131.8	136.4	141.7	146.3	25.9	29.2	34.9	40.7
11	137.2	141.7	148.1	153.4	28.4	32.7	39.3	45.5
12	142.7	147.8	155.4	160.8	31.6	36.4	43.5	50.6
13	148.8	154.2	160.8	165.4	36.3	41.5	49.1	56.5
14	152.9	157.2	163.1	167.1	41.3	46.0	53.0	60.5
15	154.7	159.0	164.1	168.4	44.2	48.4	55.0	62.6
16	155.7	159.5	164.6	169.2	45.8	50.0	56.4	64.0
17	156.0	159.8	164.8	169.4	46.6	50.9	57.3	65.0
18	156.2	160.0	165.1	169.4	46.9	51.3	57.8	65.5
	Inches	*Inches*	*Inches*	*Inches*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
4	38.7	39.9	41.4	42.9	30.3	34.1	38.3	42.4
5	41.2	42.6	44.3	45.6	34.8	39.2	43.5	48.2
6	43.5	44.9	46.7	48.2	39.4	43.7	49.3	54.2
7	45.7	47.2	49.2	50.8	44.3	49.0	55.5	61.5
8	47.9	49.5	51.5	53.1	48.7	54.2	62.1	69.9
9	50.0	51.6	53.6	55.3	52.6	59.2	68.8	79.1
10	51.9	53.7	55.8	57.6	57.0	64.4	76.9	89.7
11	54.0	55.8	58.3	60.4	62.6	72.0	86.6	100.4
12	56.2	58.2	61.2	63.3	69.7	80.2	95.9	111.5
13	58.6	60.7	63.2	65.1	80.1	91.5	108.3	124.5
14	60.2	61.9	64.2	65.8	91.0	101.5	116.9	133.3
15	60.9	62.6	64.6	66.3	97.4	106.8	121.2	138.1
16	61.3	62.8	64.8	66.6	100.9	110.2	124.3	141.1
17	61.4	62.9	64.9	66.7	102.8	112.2	126.4	143.3
18	61.5	63.0	65.0	66.7	103.5	113.0	127.5	144.5

Boyd tables (1952)

Smoothed percentiles of heights and weights of Denver Child Research Council boys and girls were published in metric units in tables 11 and 12 of "An Introduction to Human Biology and Anatomy for First Year Medical Students" (Boyd 1952). The height values were also published by Maresh (1955). The data in these tables represent nearly 1,200 meas-urements of both height and weight on succeeding birthdays of about 175 children aged 2 to 18 years. Insufficient longitudinal data were available to cover this span of years, but measurements of many of the children were repeated over quite a period of years.

The original data[7] and calculated English equivalents are presented in tables 44 and 45.

[7] Published with permission of Edith Boyd.

TABLE 44.—*Boyd (1952)—Percentile standards for height and weight for age—boys*

Age (years)	Height percentiles					Weight percentiles				
	10	25	50	75	90	10	25	50	75	90
	Cm.	*Cm.*	*Cm.*	*Cm.*	*Cm.*	*Kg.*	*Kg.*	*Kg.*	*Kg.*	*Kg.*
2	83.0	84.3	85.8	87.1	87.9	11.0	11.7	12.4	13.0	13.9
3	91.4	93.0	94.6	95.6	96.9	13.1	13.8	14.4	15.2	16.1
4	99.0	100.8	102.2	103.6	105.1	13.6	15.0	15.8	16.3	17.2
5	105.8	107.8	109.3	110.8	112.5	16.9	17.6	18.4	19.4	20.6
6	111.9	114.1	116.0	117.5	119.3	18.9	19.6	20.6	21.9	23.4
7	117.6	120.0	122.3	124.1	126.8	20.9	21.7	23.1	24.8	26.6
8	123.2	125.6	128.2	130.6	133.6	22.9	24.0	26.0	28.1	30.2
9	128.5	131.2	134.0	136.7	139.2	25.0	26.6	29.2	31.8	34.1
10	133.4	136.4	139.4	142.4	144.8	27.4	29.4	32.4	35.4	38.2
11	137.9	140.8	144.0	147.8	150.1	29.8	32.3	35.8	39.2	42.4
12	142.2	145.1	149.0	153.2	156.1	32.2	35.3	39.0	43.0	46.6
13	147.5	150.7	155.4	159.0	163.3	34.9	38.7	43.4	48.0	52.0
14	153.4	157.7	162.9	166.3	170.8	39.9	44.7	50.4	54.2	58.4
15	160.0	165.0	169.8	173.5	177.4	46.1	50.9	56.4	61.0	65.0
16	166.5	171.0	175.1	178.7	182.0	51.0	55.6	60.7	66.4	71.4
17	169.0	173.3	177.4	180.8	183.8	54.6	59.0	63.4	69.8	76.8
18	170.5	174.3	178.2	181.6	184.6	57.6	60.9	64.6	72.0	78.6
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
2	32.7	33.2	33.8	34.3	34.6	24.2	25.8	27.3	28.7	30.6
3	36.0	36.6	37.2	37.6	38.1	28.9	30.4	31.7	33.5	35.5
4	39.0	39.7	40.2	40.8	41.4	30.0	33.1	34.8	35.9	37.9
5	41.7	42.4	43.0	43.6	44.3	37.3	38.8	40.6	42.8	45.4
6	44.1	44.9	45.7	46.3	47.0	41.7	43.2	45.4	48.3	51.6
7	46.3	47.2	48.1	48.9	49.9	46.1	47.8	50.9	54.7	58.6
8	48.5	49.4	50.5	51.4	52.6	50.5	52.9	57.4	61.9	66.6
9	50.6	51.7	52.8	53.8	54.8	55.1	58.6	64.4	70.1	75.2
10	52.5	53.7	54.9	56.1	57.0	60.4	64.8	71.4	78.0	84.2
11	54.3	55.4	56.7	58.2	59.1	65.7	71.2	78.9	86.4	93.5
12	56.0	57.1	58.7	60.3	61.5	71.0	77.8	86.0	94.8	102.7
13	58.1	59.3	61.2	62.6	64.3	76.9	85.3	95.7	105.8	114.6
14	60.4	62.1	64.1	65.5	67.2	88.0	98.5	111.1	119.5	128.7
15	63.0	65.0	66.9	68.3	69.8	101.6	112.2	124.3	134.5	143.3
16	65.6	67.3	68.9	70.4	71.7	112.4	122.6	133.8	146.4	157.4
17	66.5	68.2	69.8	71.2	72.4	120.4	130.1	139.8	153.9	169.3
18	67.1	68.6	70.2	71.5	72.7	127.0	134.3	142.4	158.7	173.3

Table 45.—*Boyd (1952)—Percentile standards for height and weight for age—girls*

Age (years)	Height percentiles					Weight percentiles				
	10	25	50	75	90	10	25	50	75	90
	Cm.	Cm.	Cm.	Cm.	Cm.	Kg.	Kg.	Kg.	Kg.	Kg.
2	80.8	83.0	85.2	87.2	88.7	9.8	10.7	11.7	12.5	13.2
3	88.6	91.0	94.1	96.6	98.3	11.6	12.4	13.9	14.7	15.6
4	95.9	98.7	102.6	104.8	106.7	13.3	14.2	16.1	17.0	18.2
5	102.9	105.7	110.1	112.5	114.3	15.0	16.3	18.3	19.7	20.8
6	109.5	111.7	116.7	119.8	121.1	16.8	18.4	20.6	22.5	23.4
7	115.4	117.4	123.1	126.4	127.7	18.8	20.5	23.2	25.3	27.2
8	121.1	123.0	129.5	132.6	134.2	21.0	22.7	26.3	28.1	32.0
9	126.6	128.7	135.8	138.8	140.2	23.2	25.4	29.8	32.0	37.4
10	131.7	134.8	141.2	144.6	147.3	25.4	28.2	33.7	37.1	42.6
11	136.3	141.6	147.5	151.7	154.6	27.6	31.5	38.0	42.9	47.5
12	141.0	149.8	155.6	159.1	161.5	32.0	36.7	43.6	48.3	52.2
13	148.2	154.9	162.4	165.3	167.3	36.0	41.5	49.4	52.1	56.6
14	153.7	158.1	165.2	168.0	170.8	38.8	44.6	52.9	55.2	60.6
15	156.9	160.5	166.6	169.0	171.9	40.4	46.6	54.9	57.6	63.8
16	158.4	162.1	167.5	169.6	172.7	41.5	48.1	56.2	59.4	65.4
17	159.1	162.9	168.0	170.2	173.5	42.2	49.2	57.0	60.7	66.2
18	159.2	163.2	168.2	171.8	175.1	42.5	49.9	57.2	61.4	66.6
	Inches	Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds	Pounds
2	31.8	32.7	33.5	34.3	34.9	21.6	23.6	25.8	27.6	29.1
3	34.9	35.8	37.0	38.0	38.7	25.6	27.3	30.6	32.4	34.4
4	37.8	38.9	40.4	41.3	42.0	29.3	31.3	35.5	37.5	40.1
5	40.5	41.6	43.3	44.3	45.0	33.1	35.9	40.3	43.4	45.9
6	43.1	44.0	45.9	47.2	47.7	37.0	40.6	45.4	49.6	51.6
7	45.4	46.2	48.5	49.8	50.3	41.4	45.2	51.1	55.8	60.0
8	47.7	48.4	51.0	52.2	52.8	46.2	50.0	58.0	61.9	70.5
9	49.8	50.7	53.5	54.6	55.2	51.1	56.0	65.7	70.5	82.5
10	51.9	53.1	55.6	56.9	58.0	56.0	62.2	74.3	81.8	93.9
11	53.7	55.7	58.1	59.7	60.9	60.8	69.4	83.8	94.6	104.7
12	55.5	59.0	61.3	62.6	63.6	70.5	80.9	96.1	106.5	115.1
13	58.3	61.0	63.9	65.1	65.9	79.4	91.5	108.9	114.9	124.8
14	60.5	62.2	65.0	66.1	67.2	85.5	98.3	116.6	121.7	133.6
15	61.8	63.2	65.6	66.5	67.7	89.1	102.7	121.0	127.0	140.7
16	62.4	63.8	65.9	66.8	68.0	91.5	106.0	123.9	131.0	144.2
17	62.6	64.1	66.1	67.0	68.3	93.0	108.5	125.7	133.8	145.9
18	62.7	64.3	66.2	67.6	68.9	93.7	110.0	126.1	135.4	146.8

Comparison of "average" heights and weights

In figures 5a and 5b comparison is made of height and weight for age from the tables of Hastings, Baldwin-Wood, Stuart-Meredith, and Boyd (tables 35, 36, 37, 40, 41, 44, 45), which give average or 50 percentile values. They illustrate that Nebraska children at the turn of the century were shorter in stature and lighter in weight than children from neighboring Iowa in the 1920's or 1940's; that except at 18 years for boys and 15 or 16 years and above for girls, Iowa children were taller in the 1940's than in the 1920's; that Colorado boys from 15 or 16 and girls from 5 years were taller than Iowa children; and that weights for Iowa and Colorado boys were similar, but Colorado girls were heavier from about 9 to 10 years than Iowa girls, as would be expected from their greater stature.
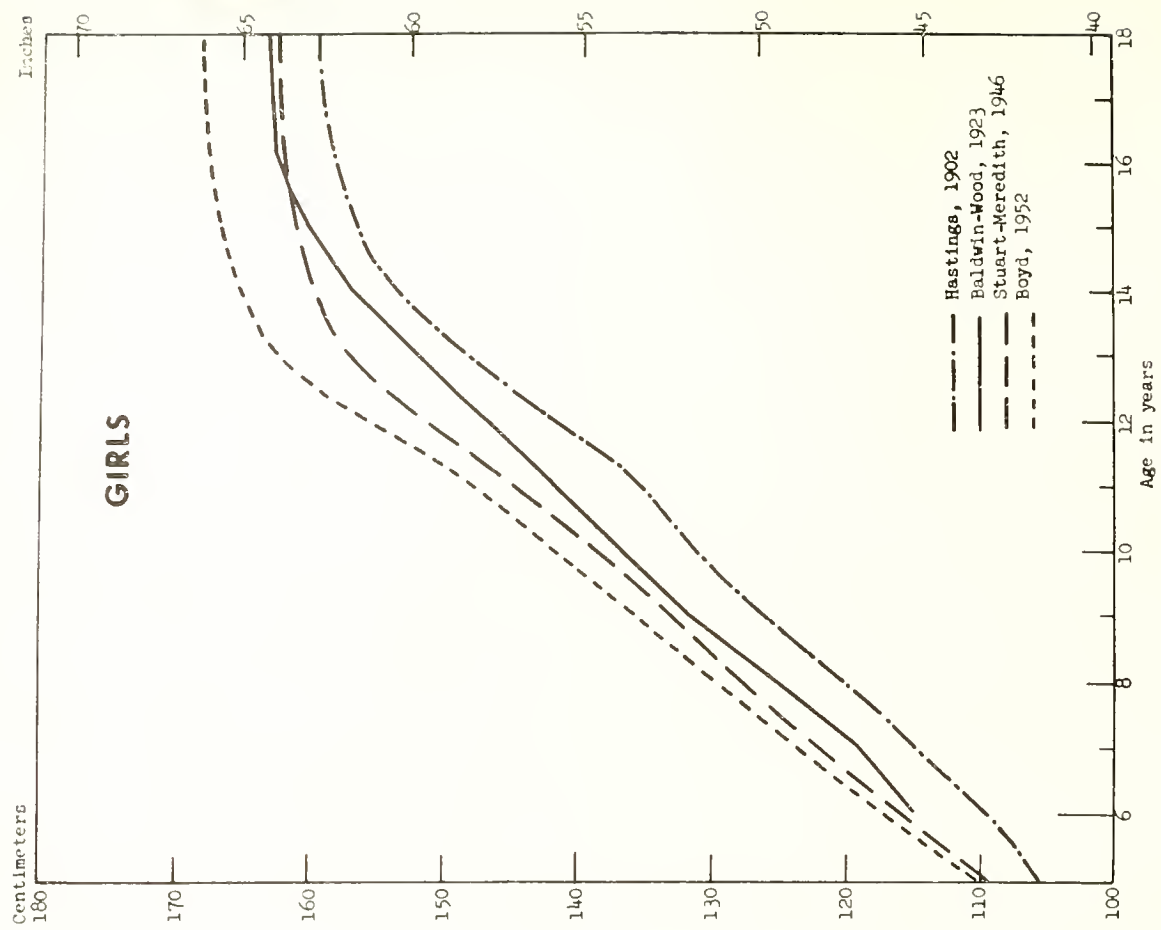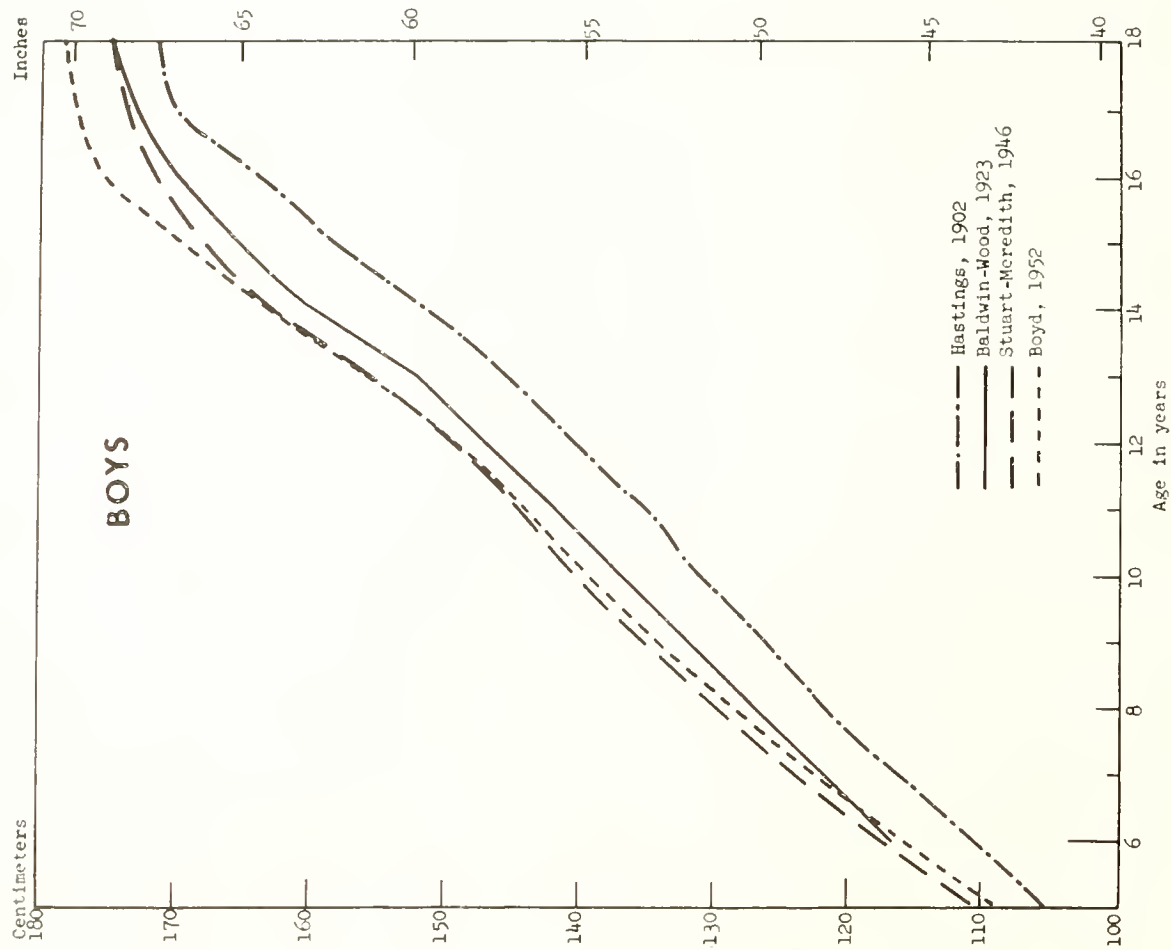
Figure 5a.—Comparison of some standards of "average" heights for boys and girls.

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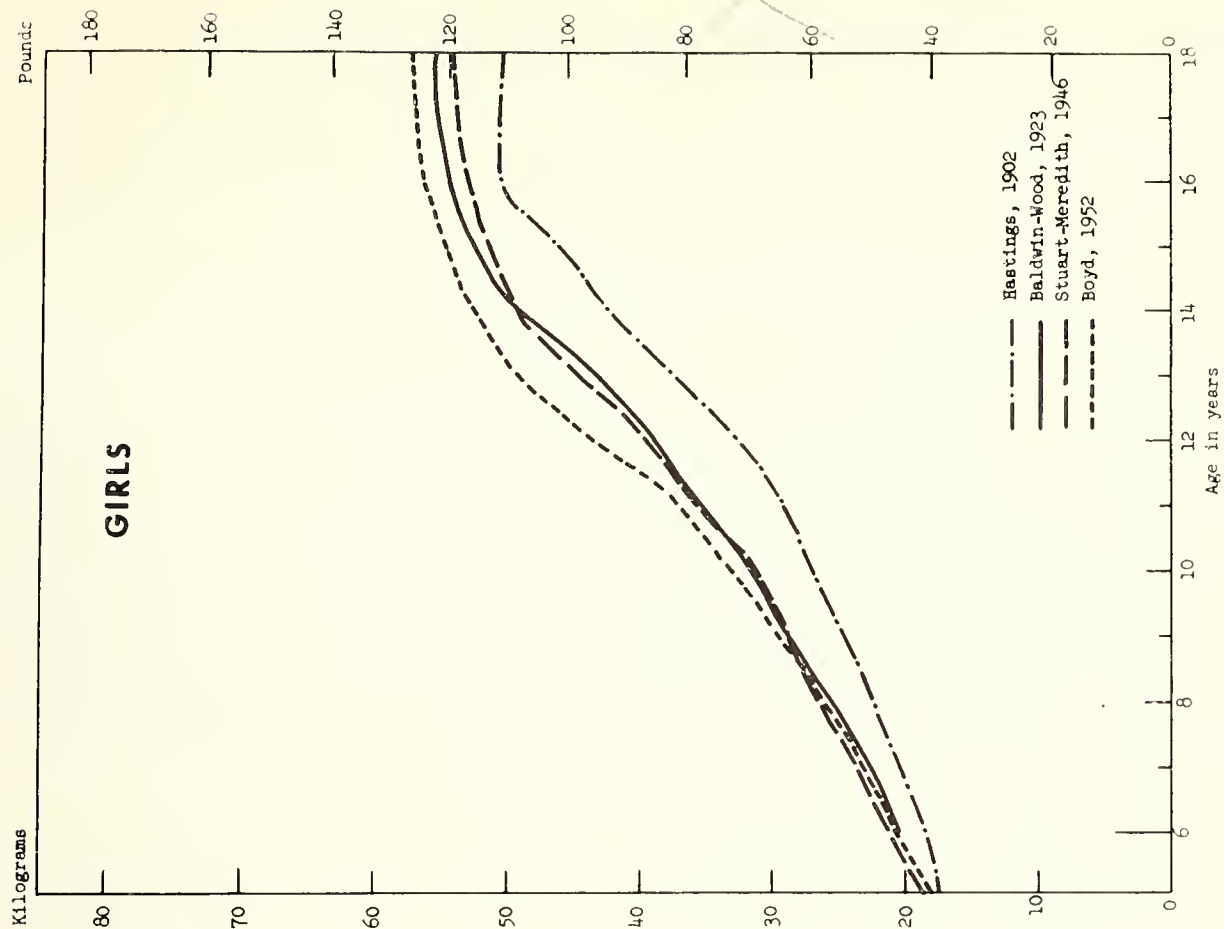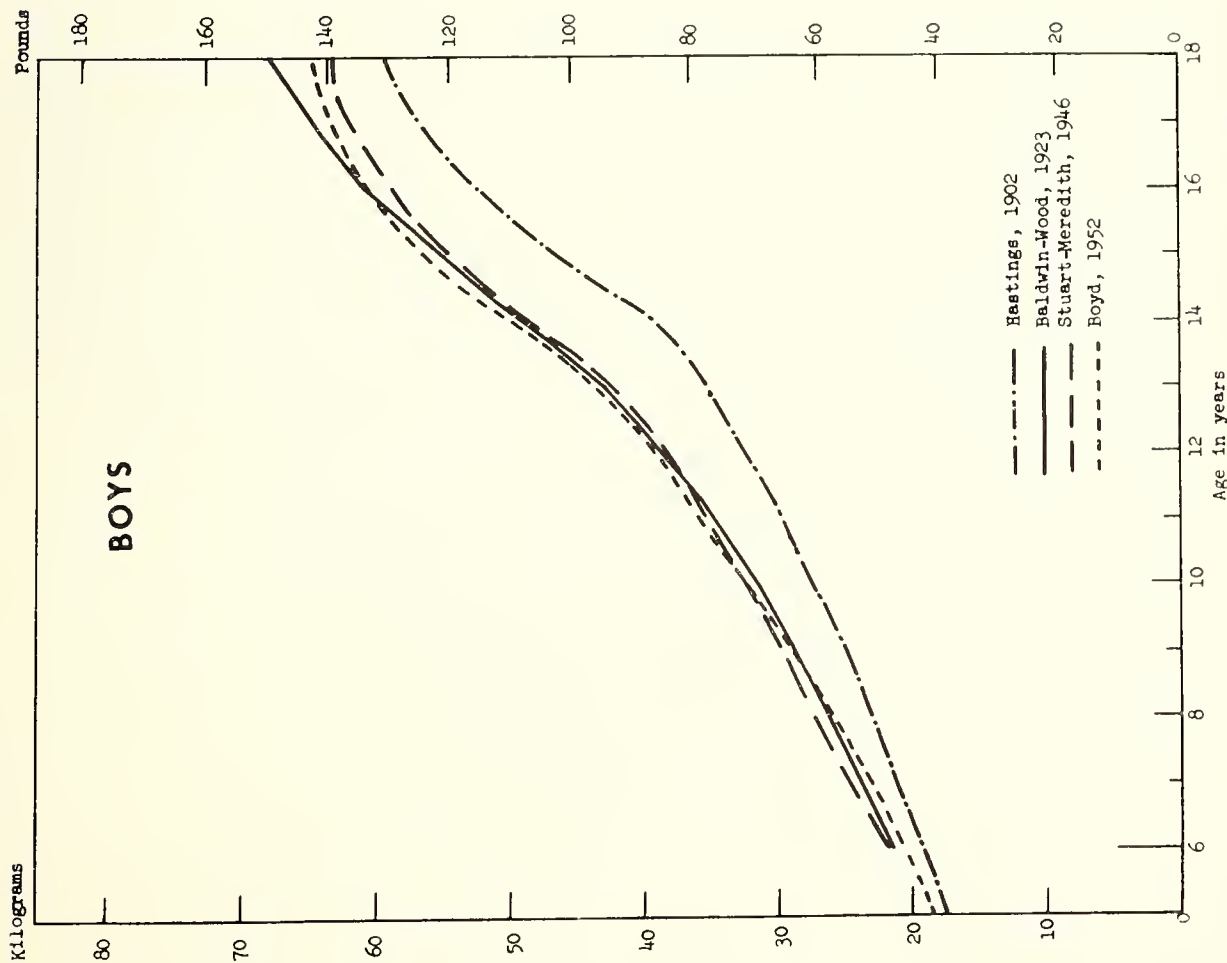
Figure 5b.—Comparison of some standards of "average" weights for boys and girls.

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Section III.—Some Factors Affecting Growth Patterns

Although average height-weight values are given in tables of standards, values for individuals and specific groups of individuals vary widely from these standards. Some examples of the factors that apparently caused these variations and the differences found are given in this section.

Height-weight-age data related to pubescence and growth

Among children in a homogeneous population group, growing up under fairly similar conditions, individual values vary widely from standards and among themselves; variations are particularly great for boys between the ages of about 12 to 17 years and for girls between 10 and 15 years. These differences are related to the time of the adolescent spurt in growth and, in turn, to the pubescent development of the individual and are illustrated in the following studies.

Richey's data relating size to age at pubescence

Richey's (1937) tables of data for growth of children from the laboratory schools of the University of Chicago related to their age at pubescence have been adapted for presentation in this compilation.[8] From his data he concluded the following: Time of pubescence has a marked correlation with height and weight of children. Early-maturing children are taller and heavier at a given age during the years of rapid growth than average maturing ones, who in turn are taller and heavier than late-maturing ones. As children approach adult growth, the average heights of all groups are similar. However, the average weights continue to differ, the early-maturing children being the heaviest and the late-maturing ones the lightest in weight. Table 46 and figures 6a and 6b illustrate these findings.

[8] Published with permission of the Society for Research in Child Development, Inc.

TABLE 46.—*Richey (1937)—Heights and weights of boys and girls related to age at pubescence or menarche*

BOYS

Age (years)	Pubescent before 14 years					Pubescent between 14 and 15 years					Pubescent at 15 years or later				
	Cases	Height		Weight		Cases	Height		Weight		Cases	Height		Weight	
	No.	Centimeters	Inches	Kilograms	Pounds	No.	Centimeters	Inches	Kilograms	Pounds	No.	Centimeters	Inches	Kilograms	Pounds
6	35	119.9	47.2	22.4	49.3	9	115.3	45.4	20.4	44.9	8	115.8	45.6	19.7	43.5
7	46	125.5	49.4	24.9	54.9	15	121.9	48.0	23.1	50.9	12	120.9	47.6	21.9	48.3
8	60	130.8	51.5	27.4	60.3	18	127.3	50.1	25.4	56.0	18	125.7	49.5	23.8	52.4
9	65	136.1	53.6	30.5	67.3	19	133.6	52.6	28.6	63.0	25	130.6	51.4	25.7	56.6
10	81	141.7	55.8	34.1	75.1	22	138.7	54.6	32.1	70.7	24	135.1	53.2	28.4	62.7
11	89	147.1	57.9	37.6	82.8	29	143.5	56.5	34.3	75.7	25	140.0	55.1	30.8	67.8
12	96	152.9	60.2	42.1	92.8	40	147.1	57.9	36.7	81.0	29	144.3	56.8	33.8	74.5
13	105	159.8	62.9	47.4	104.6	54	152.4	60.0	41.1	90.7	35	148.6	58.5	37.0	81.6
14	112	167.1	65.8	53.3	117.5	87	159.5	62.8	46.7	103.0	50	153.2	60.3	40.8	89.9
15	90	173.5	68.3	58.9	129.8	86	167.1	65.8	53.1	117.0	70	160.5	63.2	46.7	103.0
16	79	176.3	69.4	63.0	138.8	73	173.0	68.1	58.4	128.7	79	167.1	65.8	52.4	115.6
17	42	176.5	69.5	65.8	145.0	53	176.3	69.4	61.9	136.4	55	171.7	67.6	57.3	126.3
18	9	176.5	69.5	66.5	146.7	20	177.8	70.0	63.9	140.8	20	179.1	70.5	61.0	134.4

GIRLS

Age (years)	Menarche before 13 years					Menarche 13 to 14 years					Menarche 14 years or later				
	Cases	Height		Weight		Cases	Height		Weight		Cases	Height		Weight	
	No.	Centimeters	Inches	Kilograms	Pounds	No.	Centimeters	Inches	Kilograms	Pounds	No.	Centimeters	Inches	Kilograms	Pounds
6	19	119.4	47.0	22.5	49.5	7	112.8	44.4	20.0	44.0	5	113.0	44.5	19.6	43.2
7	33	123.4	48.6	24.6	54.3	12	122.4	48.2	23.7	52.3	13	117.9	46.4	21.4	47.1
8	44	129.5	51.0	27.4	60.3	15	126.5	49.8	25.6	56.5	13	124.2	48.9	24.0	52.9
9	58	135.4	53.3	31.2	68.7	19	131.3	51.7	29.2	64.4	18	128.0	50.4	25.8	56.9
10	62	141.7	55.8	35.9	79.2	21	137.4	54.1	32.1	70.7	19	133.8	52.7	28.3	62.3
11	75	148.3	58.4	40.7	89.7	27	143.0	56.3	36.6	80.6	25	137.9	54.3	31.4	69.3
12	85	155.4	61.2	46.3	102.0	37	151.1	59.5	41.5	91.5	36	144.3	56.8	35.1	77.4
13	93	160.0	63.0	51.8	114.2	53	156.7	61.7	47.1	103.8	48	151.6	59.7	39.4	86.9
14	115	162.1	63.8	54.8	120.9	91	160.8	63.3	50.8	112.1	70	157.2	61.9	44.6	98.4
15	108	162.8	64.1	56.4	124.4	105	162.6	64.0	53.5	117.9	84	161.8	63.7	49.4	109.0
16	98	163.6	64.4	57.4	126.6	96	163.3	64.3	54.4	119.9	74	163.3	64.3	52.1	114.9
17	61	163.3	64.3	57.7	127.1	74	162.6	64.0	54.5	120.2	58	163.3	64.3	52.9	116.6

Figure 6a.—Richey's data relating heights of boys and girls to age at pubescence or menarche.
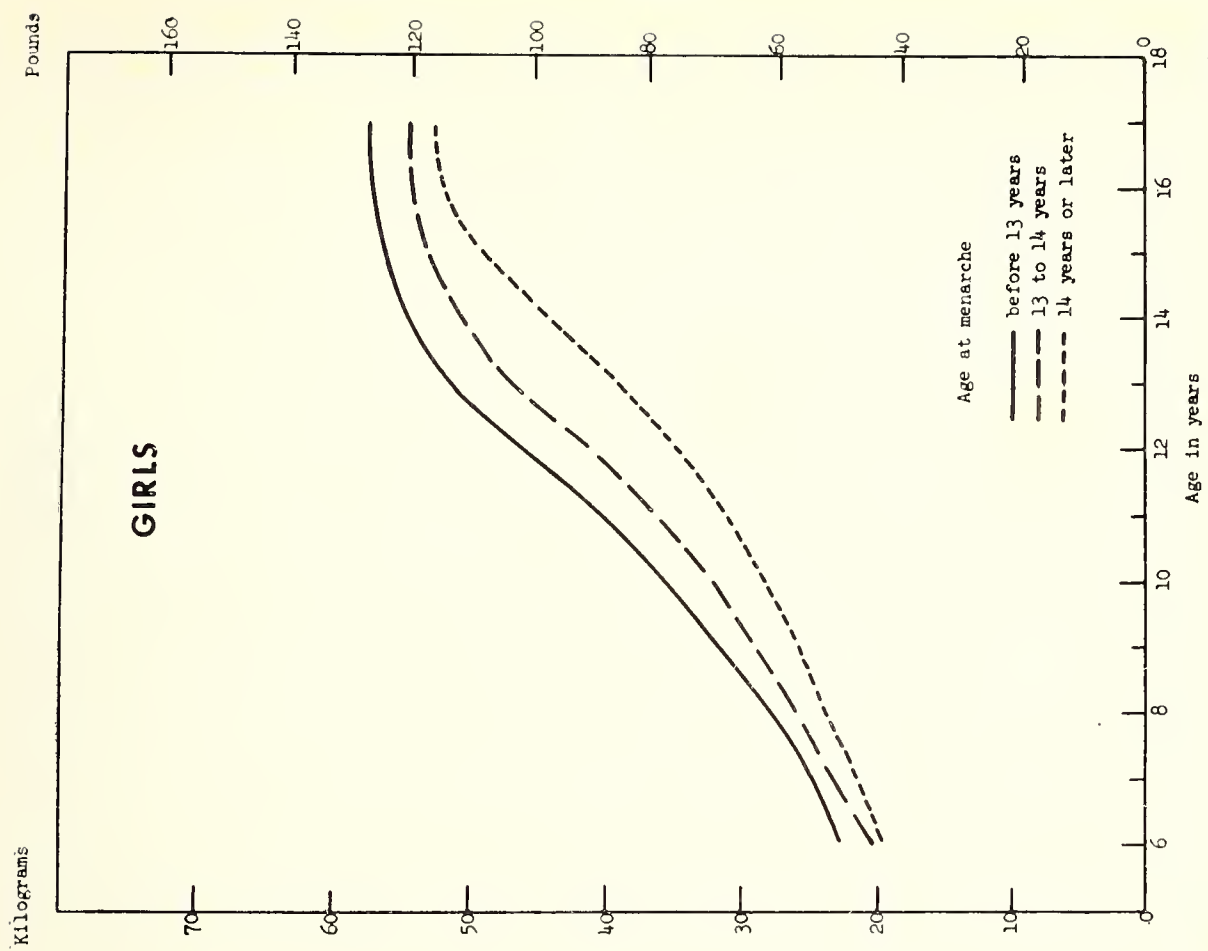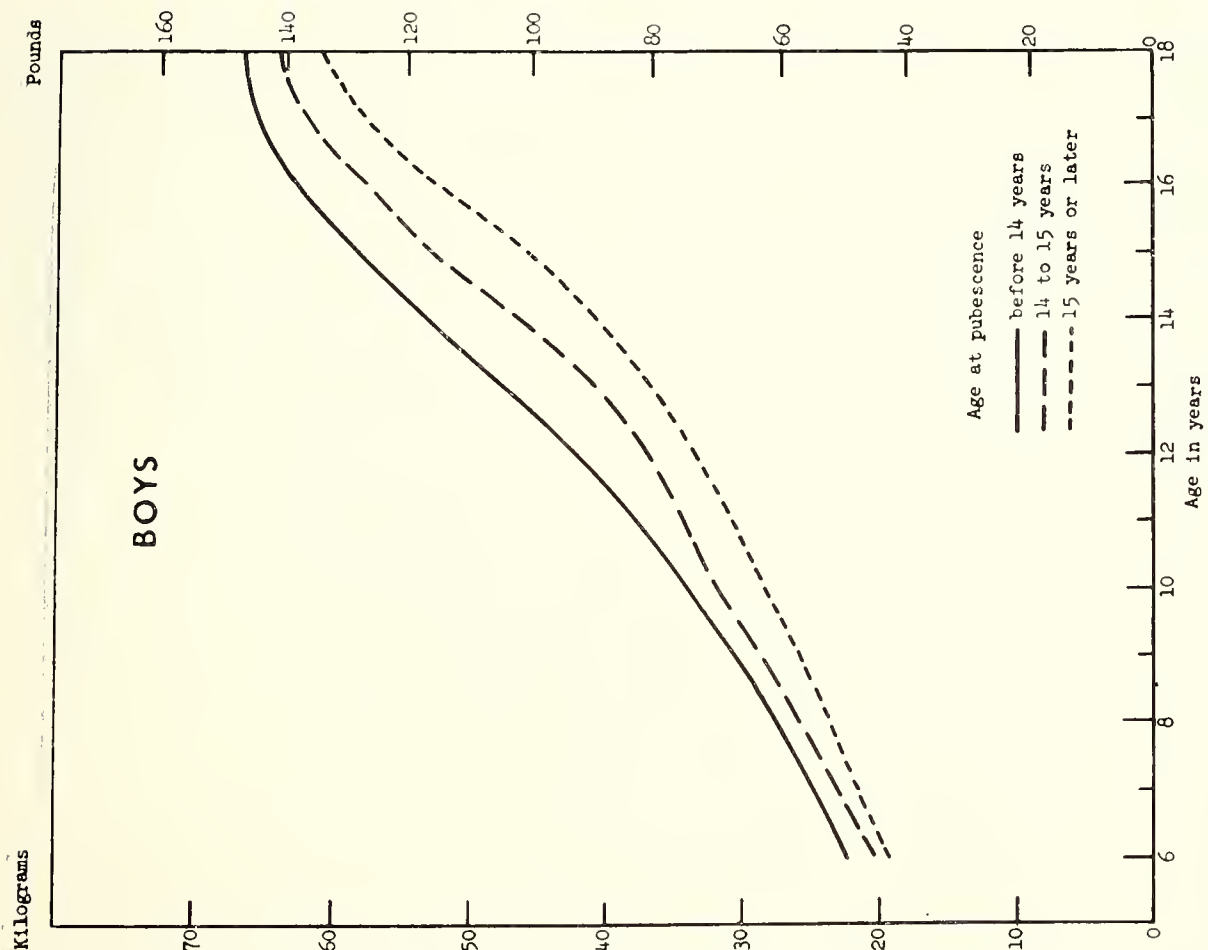
Figure 6b.—Richey's data relating weights of boys and girls to age at pubescence or menarche.

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Shuttleworth's data relating size to age of maximum growth rate

Shuttleworth (1939) considered that classification by age at the time of maximum growth was a more reliable indicator of sexual maturity than classification by signs of sexual maturity. His data are presented in table 47 and in figures 7a and 7b.[9] Maximum growth preceded pubescence by about 1 year. The children having the earliest maximum increment of growth were taller and heavier than those having the average or latest maximum increment of growth. This was true at each age up to 17 years for boys and 15 years for girls. The children having the earliest maximum increment were heavier than the other two groups throughout the study.

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TABLE 47.—*Shuttleworth (1939)—Heights and weights of boys and girls related to age at maximum growth*

BOYS

Age (years)	Maximum growth at 12.5–13.5 yr.					Maximum growth at 14.0–15.5 yr.					Maximum growth at 16.0–17.0 yr.				
	Cases	Height		Weight		Cases	Height		Weight		Cases	Height		Weight	
	No.	Cm.	In.	Kg.	Lb.	No.	Cm.	In.	Kg.	Lb.	No.	Cm.	In.	Kg.	Lb.
7	77	120.7	47.5	24.0	52.9	317	118.9	46.8	22.9	50.5	98	117.4	46.2	21.6	47.6
8	97	126.6	49.8	27.1	59.7	387	124.6	49.1	25.5	56.2	127	122.7	48.3	23.9	52.7
9	109	132.1	52.0	30.1	66.4	429	130.0	51.2	28.2	62.2	135	127.9	50.4	26.3	58.0
10	112	137.3	54.1	33.3	73.4	452	135.1	53.2	31.0	68.3	139	132.8	52.3	28.8	63.5
11	112	142.6	56.1	37.1	81.8	453	139.9	55.1	34.1	75.2	141	137.3	54.1	31.3	69.0
12	112	149.4	58.8	42.5	93.7	454	144.8	57.0	37.6	82.9	141	141.7	55.8	34.0	75.0
13	112	159.8	62.9	50.4	111.1	454	150.1	59.1	41.6	91.7	141	146.0	57.5	36.8	81.0
14	112	166.8	65.7	57.2	126.1	454	158.3	62.3	48.3	106.5	141	150.3	59.2	39.9	88.0
15	111	170.0	66.9	61.8	136.2	449	166.4	65.5	55.8	123.0	141	156.4	61.6	45.0	99.2
16	102	171.2	67.4	64.4	142.0	426	170.5	67.1	60.7	133.8	141	165.0	65.0	52.5	115.7
17	76	171.9	67.7	66.1	145.7	336	172.3	67.8	63.5	140.0	114	170.5	67.1	58.3	128.5
18	32	172.3	67.8	67.3	148.4	144	173.0	68.1	65.5	144.4	44	173.0	68.1	62.1	136.9

GIRLS

Age (years)	Maximum growth at 10.5–11.5 yr.					Maximum growth at 12.0–13.0 yr.					Maximum growth at 13.5–14.5 yr.				
	Cases	Height		Weight		Cases	Height		Weight		Cases	Height		Weight	
	No.	Cm.	In.	Kg.	Lb.	No.	Cm.	In.	Kg.	Lb.	No.	Cm.	In.	Kg.	Lb.
7	109	119.0	46.8	23.1	50.9	259	116.9	46.0	21.7	47.8	112	115.8	45.6	20.8	45.9
8	140	124.8	49.1	25.9	57.1	339	122.6	48.3	24.2	53.4	145	121.1	47.7	23.1	50.9
9	153	130.6	51.4	29.0	63.9	383	127.9	50.4	26.9	59.3	170	126.2	49.7	25.4	56.0
10	155	137.3	54.1	33.3	73.4	407	133.1	52.4	29.7	65.5	175	131.0	51.6	27.8	61.3
11	155	146.0	57.5	39.4	86.9	413	138.5	54.5	33.2	73.2	177	135.8	53.5	30.6	67.5
12	155	152.4	60.0	45.9	101.2	413	145.7	57.4	38.3	84.4	177	140.7	55.4	33.8	74.5
13	155	155.6	61.3	50.2	110.7	413	153.0	60.2	44.3	97.7	177	147.5	58.1	38.8	85.5
14	153	157.0	61.8	52.9	116.6	411	156.8	61.7	49.1	108.2	177	154.2	60.7	44.7	98.5
15	145	157.7	62.1	54.4	119.9	400	158.5	62.4	52.0	114.6	173	157.4	62.0	49.2	108.5
16	128	158.0	62.2	55.0	121.3	374	159.2	62.7	53.5	117.9	157	158.9	62.6	51.5	113.5
17	90	158.2	62.3	55.3	121.9	294	159.6	62.8	54.4	119.9	109	159.5	62.8	53.1	117.1
18	26	158.4	62.4	55.1	121.5	130	159.9	63.0	54.6	120.4	49	159.8	62.9	53.9	118.8
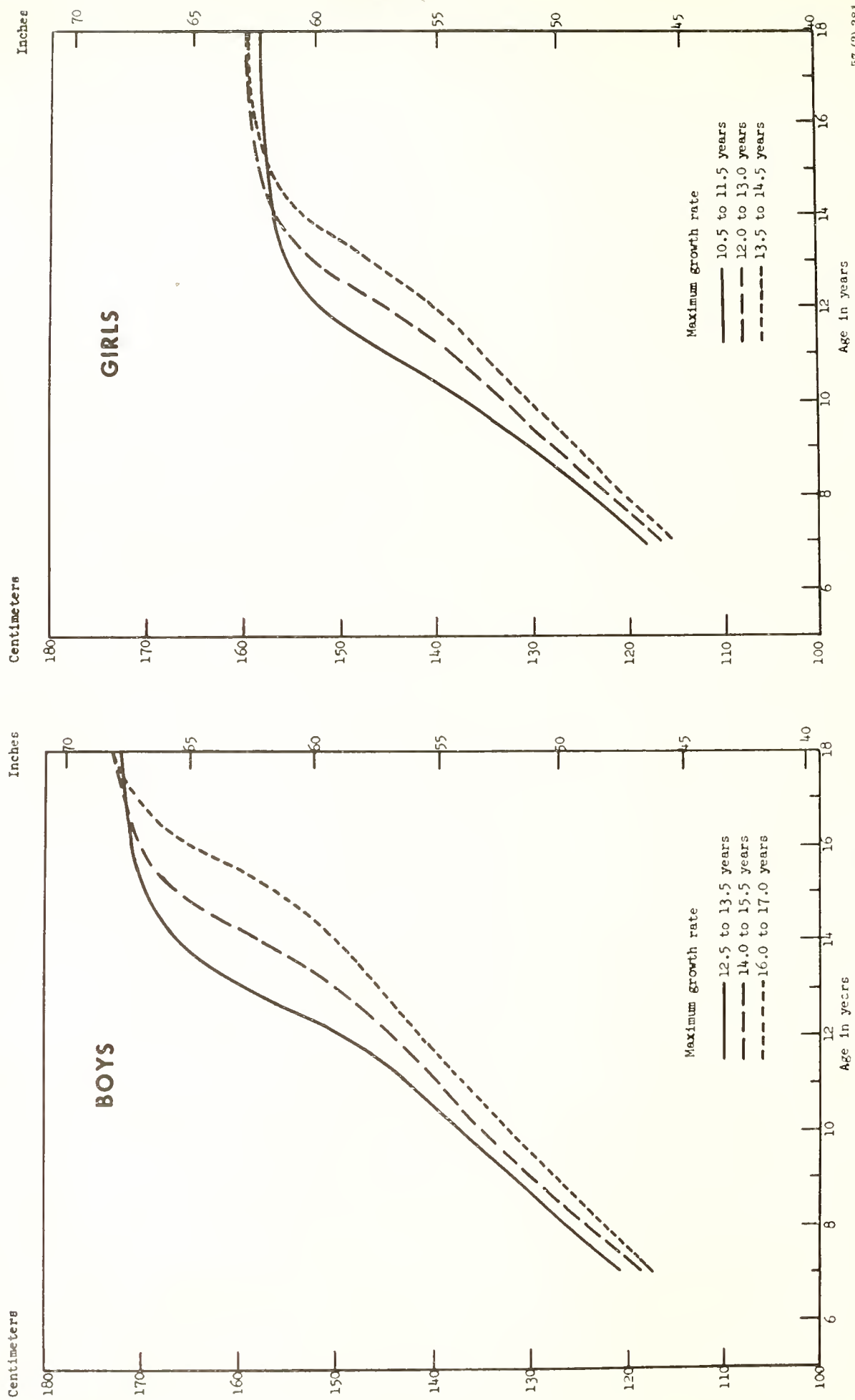
Figure 7a.—Shuttleworth's data relating heights of boys and girls to age of maximum growth rate.
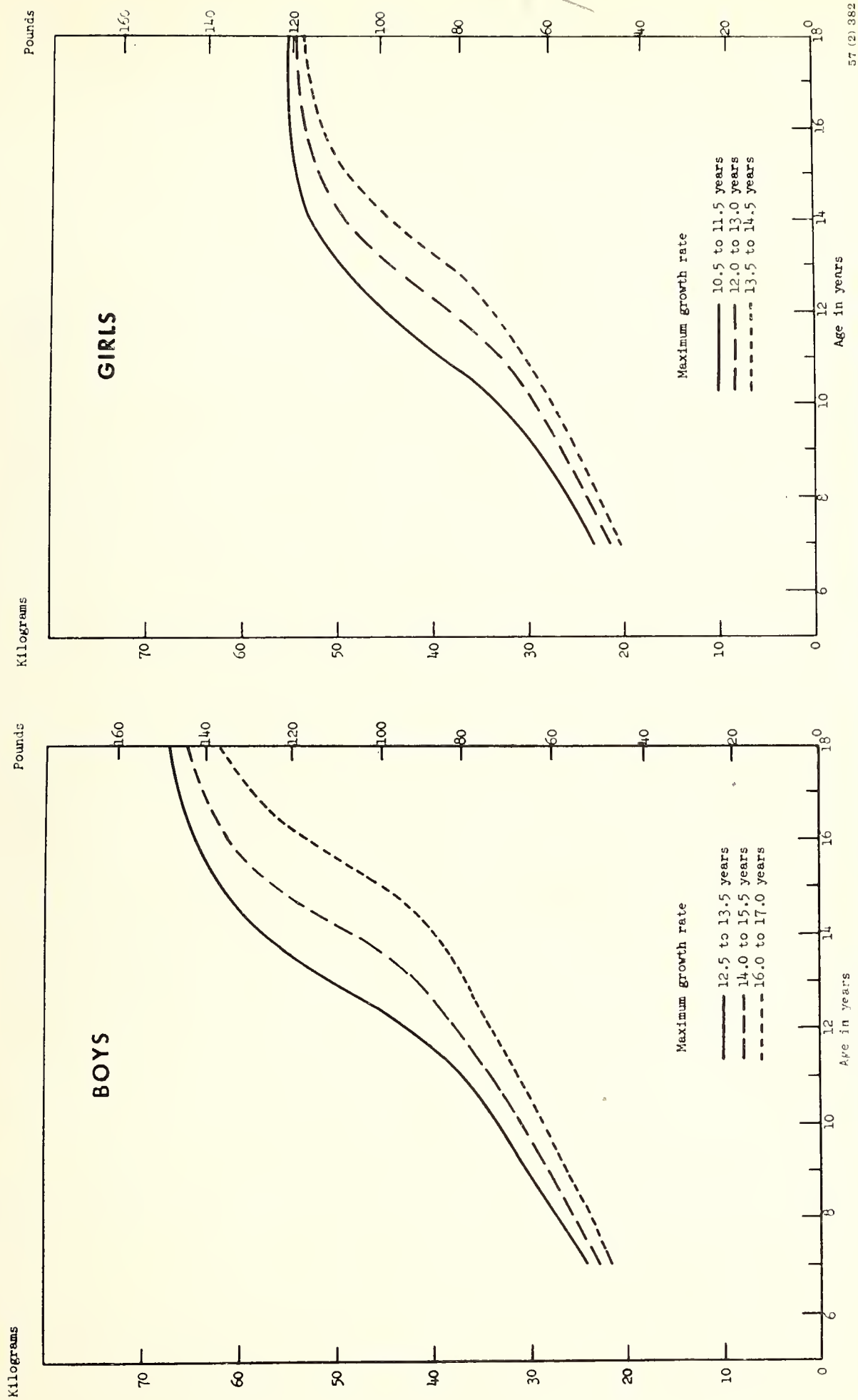
Figure 7b.—Shuttleworth's data relating weights of boys and girls to age of maximum growth rate.

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Bayley's data relating size to rate of physical maturing

Bayley (1956) pointed out how misleading conventional height-for-age curves are when growth of an individual child is compared with them, owing to the wide spread among children in ages at which rapid growth starts. Her data for children with accelerated, average, and retarded growth are presented in table 48 and in figures 8a through 8d.[10] Over 300 healthy California children were measured repeatedly from birth to 18 or 21 years of age as a part of the Berkeley growth study, the Oakland study on adolescence, or the Tuddenham study. In the figures, data were grouped so that for each curve the measure at any point represents an average for children who were alike in their physical maturity. Increment curves are also presented in figures 8a through 8d to correspond to average yearly gains shown by the three sets of data.

[10] Published with permission of Nancy Bayley and the Journal of Pediatrics.

Supplies of charts with tables may be obtained from the Institute of Child Welfare, University of California, Berkeley 4, Calif.

TABLE 48.—*Bayley (1956)—Heights and weights of boys and girls related to their rate of maturing* [1]

BOYS' RATE

Age (years)	Accelerated				Average				Retarded			
	Height		Weight		Height		Weight		Height		Weight	
	Centimeters	Inches	Kilograms	Pounds	Centimeters	Inches	Kilograms	Pounds	Centimeters	Inches	Kilograms	Pounds
1	78.5	30.9	10.8	23.8	78.0	30.7	10.4	22.9	74.4	29.3	10.6	23.4
2	89.4	35.2	14.1	31.1	87.9	34.6	13.3	29.3	83.3	32.8	12.4	27.3
3	98.0	38.6	16.1	35.5	96.5	38.0	15.7	34.6	91.7	36.2	13.9	30.6
4	105.4	41.5	18.8	41.4	103.6	40.8	17.7	39.0	100.6	39.6	16.2	35.7
5	113.0	44.5	20.8	45.9	111.0	43.7	19.4	52.8	107.4	42.3	18.3	40.3
6	119.9	47.2	23.5	51.8	116.3	45.8	21.6	47.6	114.0	44.9	20.0	44.1
7	127.0	50.0	25.8	56.9	123.7	48.7	24.0	52.9	119.4	47.0	22.0	48.5
8	133.4	52.5	29.5	65.0	129.3	50.9	26.4	58.2	125.5	49.4	24.8	54.7
9	139.4	54.9	33.8	74.5	134.9	53.1	30.3	66.8	131.6	51.8	27.3	60.2
10	145.5	57.3	39.0	86.0	141.5	55.3	33.6	74.1	137.4	54.1	30.0	66.1
11	151.4	59.6	44.1	97.2	146.0	57.5	37.3	82.2	141.7	55.8	33.3	73.4
12	157.0	61.8	49.8	109.8	150.1	59.1	41.4	91.3	146.6	57.7	36.6	80.7
13	166.6	65.6	56.7	124.8	156.0	61.4	46.0	101.4	150.0	59.4	40.9	90.2
14	174.0	68.5	61.0	134.5	164.1	64.6	52.6	116.0	156.7	61.7	45.4	100.1
15	179.6	70.7	67.1	147.9	173.0	68.1	60.7	133.8	163.1	64.2	50.9	112.2
16	182.1	71.7	69.9	154.1	178.1	70.1	64.7	142.6	172.0	67.7	59.4	131.0
17	182.1	71.7	70.7	155.9	179.1	70.5	67.9	149.7	176.5	69.5	64.9	143.1
18	------	------	------	------	180.1	70.9	69.9	154.1	179.1	70.5	68.4	150.8
19	------	------	------	------	------	------	------	------	181.1	71.3	68.8	151.7

GIRLS' RATE

Age (years)	Accelerated				Average				Retarded			
	Height		Weight		Height		Weight		Height		Weight	
	Centimeters	Inches	Kilograms	Pounds	Centimeters	Inches	Kilograms	Pounds	Centimeters	Inches	Kilograms	Pounds
1	77.7	30.6	10.9	24.0	73.9	29.1	9.8	21.5	71.9	28.3	9.6	21.2
2	87.4	34.4	13.7	30.2	87.4	34.4	12.7	28.0	84.6	33.3	11.7	25.9
3	96.0	37.8	15.7	34.7	95.2	37.5	14.7	32.4	93.2	36.7	13.9	30.6
4	104.9	41.3	19.1	42.1	103.1	40.6	17.0	37.5	100.1	39.4	15.3	33.7
5	112.8	44.4	21.8	48.1	109.5	43.1	18.7	41.2	105.9	41.7	17.2	37.9
6	119.1	46.9	24.1	53.2	116.6	45.9	21.2	46.7	113.0	44.5	19.5	43.0
7	125.0	49.2	26.0	57.3	122.2	48.1	24.0	52.9	119.9	47.2	21.6	47.6
8	132.1	52.0	30.3	66.8	128.0	50.4	27.2	60.0	125.0	49.2	23.2	51.1
9	140.0	55.1	35.6	78.5	133.9	52.7	30.1	66.4	130.8	51.5	27.1	59.7
10	145.5	57.3	41.8	92.2	140.0	55.1	34.5	76.1	135.4	53.3	29.4	64.8
11	153.4	60.4	49.4	108.9	146.0	57.5	39.3	86.6	141.0	55.5	31.7	69.9
12	160.3	63.1	56.6	124.8	154.2	60.7	45.0	99.2	146.6	57.7	35.4	78.0
13	163.3	64.3	59.5	131.2	160.0	63.0	51.0	112.4	151.9	59.8	39.4	86.9
14	164.6	64.8	61.2	135.0	163.1	64.2	54.9	121.0	158.5	62.4	44.9	99.0
15	165.1	65.0	62.9	138.7	164.6	64.8	58.4	128.8	162.1	63.8	49.2	108.5
16	165.6	65.2	63.2	139.3	165.6	65.2	59.7	131.6	163.8	64.5	52.0	114.6
17	165.6	65.2	62.4	137.6	165.9	65.3	60.0	132.3	164.6	64.8	54.1	119.3
18	165.6	65.2	61.0	134.5	165.9	65.3	59.8	131.8	164.8	64.9	54.0	119.0

[1] Heights and weights at the chronological ages were interpolated from a large graph based on mean values calculated at 2-percent intervals of mature height. There were 38 boys and 27 girls in the accelerated groups, 106 boys and 108 girls in the average groups, and 31 boys and 25 girls in the retarded groups.

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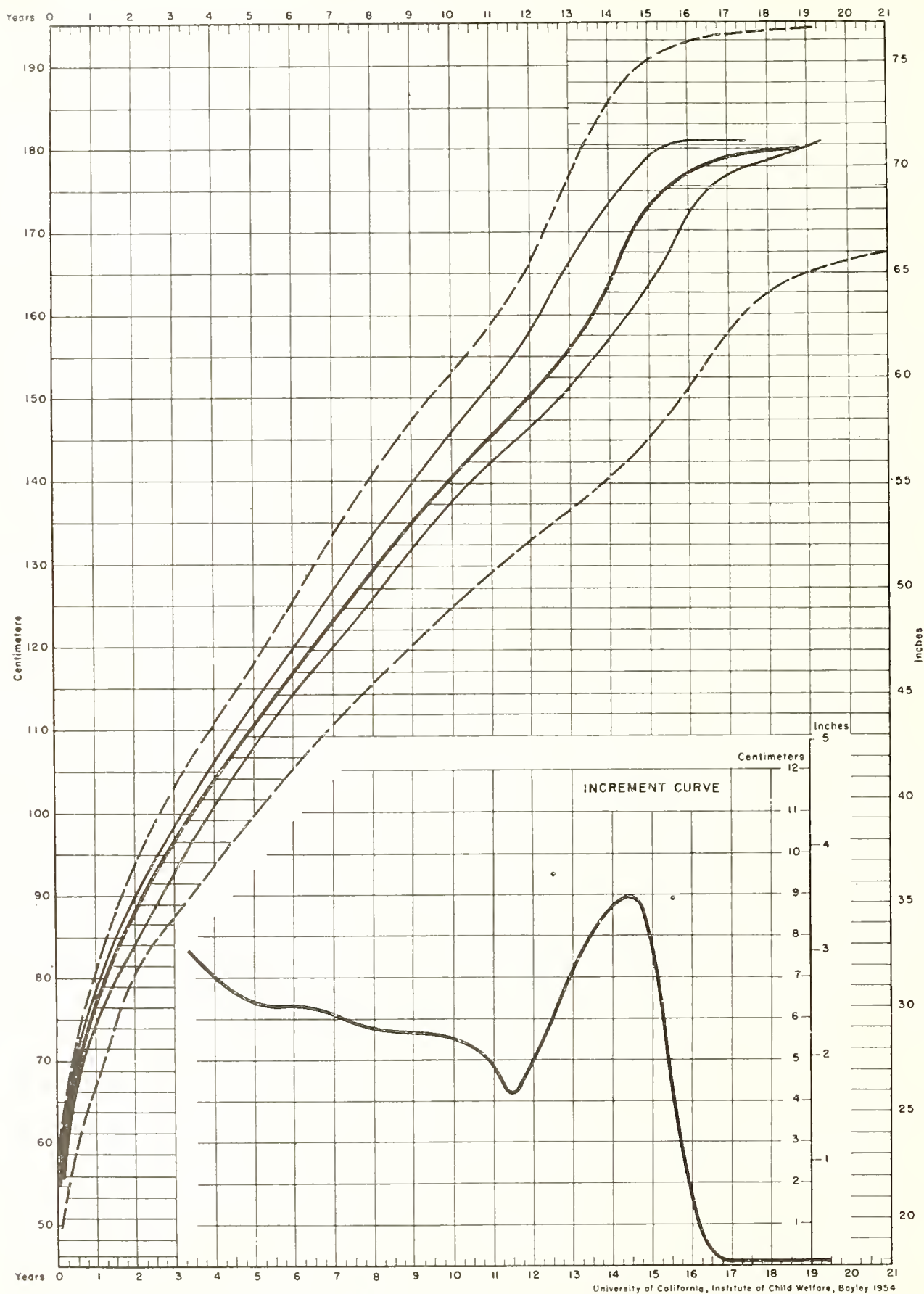
Figure 8a.—Bayley's data relating heights of boys to rate of physical maturing.

Name:

INCREMENT CURVE
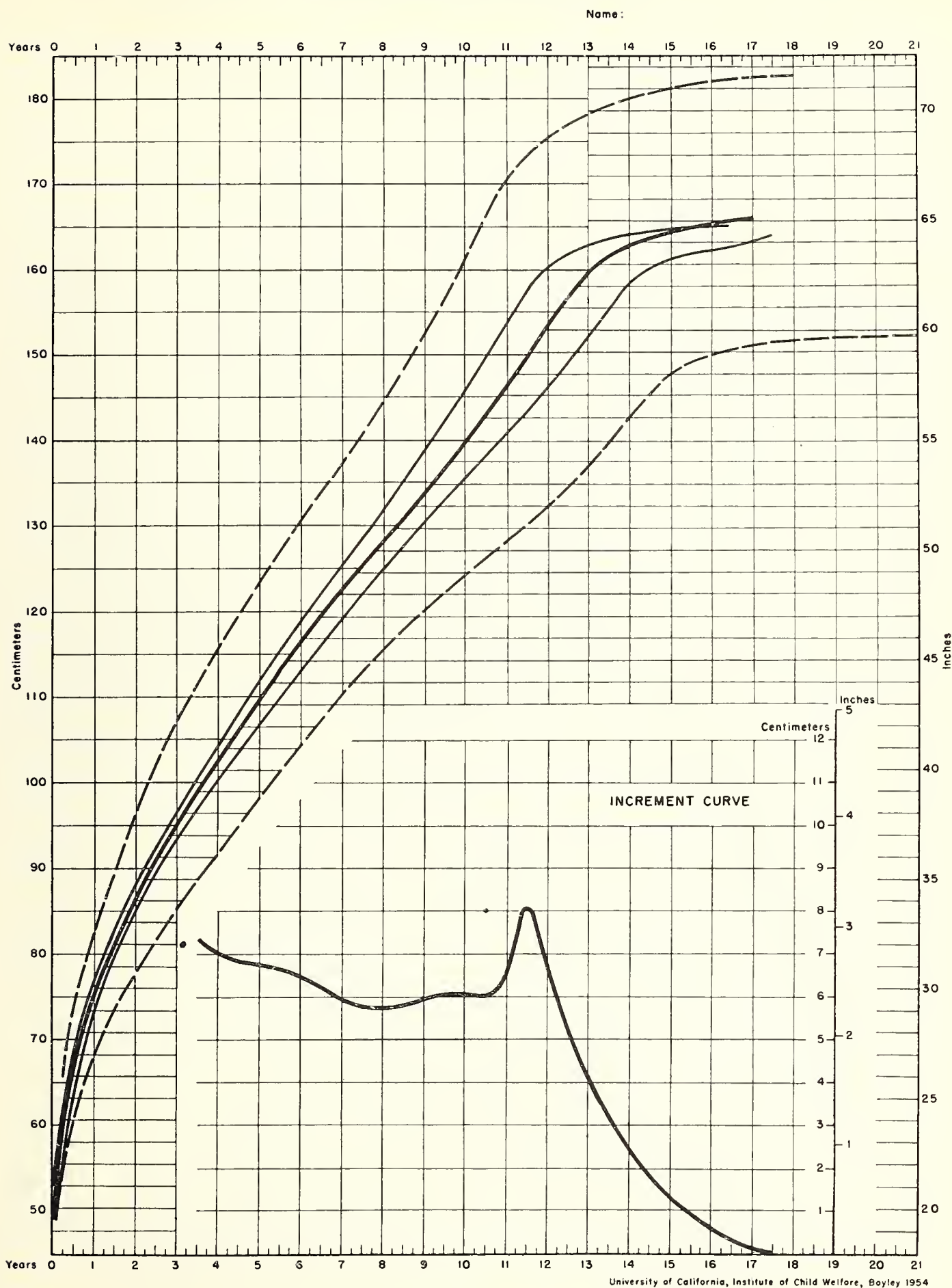
University of California, Institute of Child Welfare, Bayley 1954

Figure 8b.—Bayley's data relating heights of girls to rate of physical maturing.

Name:

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University of California, Institute of Child Welfare, Bayley 1954
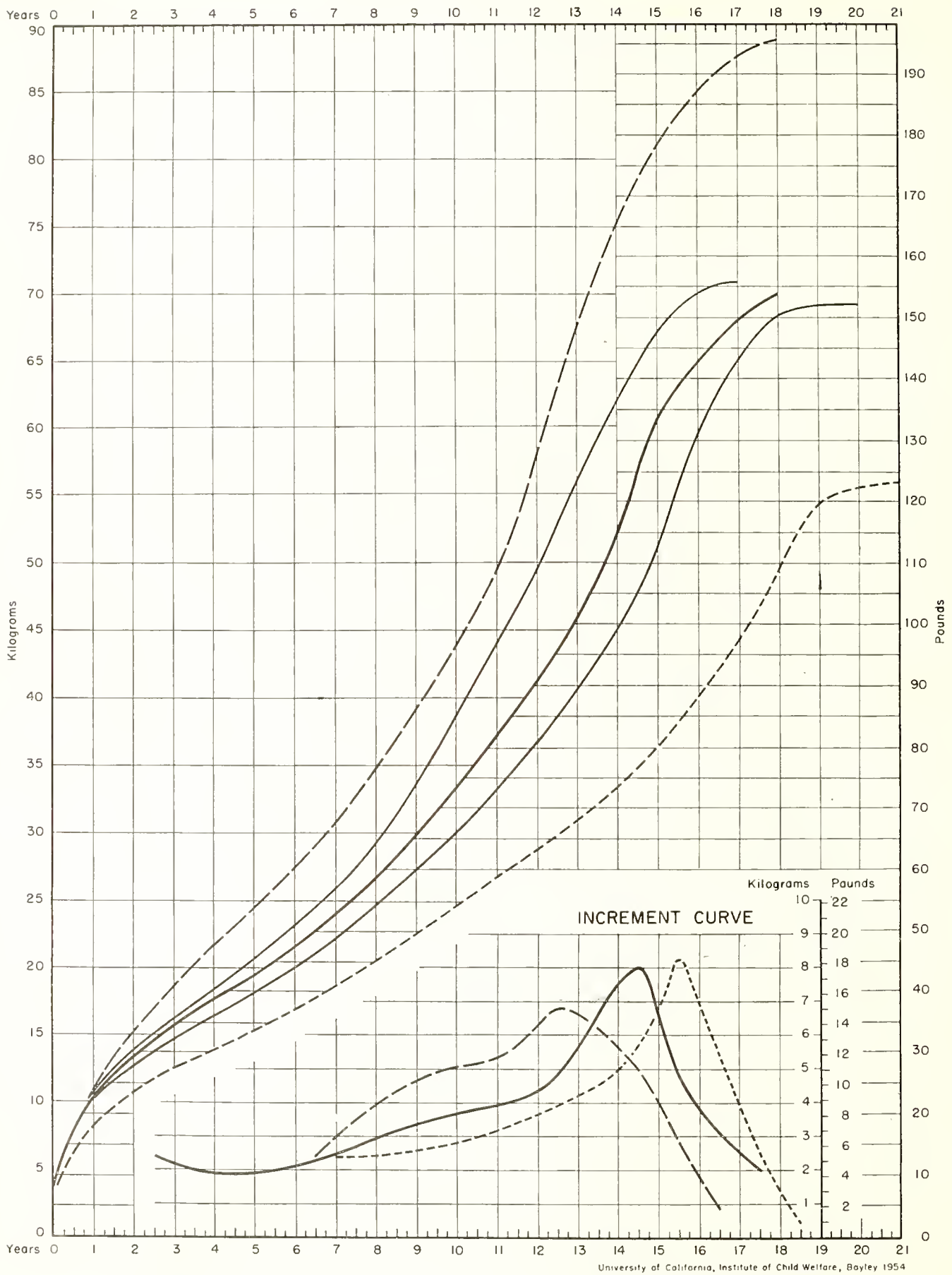
Figure 8c.—Bayley's data relating weights of boys to rate of physical maturing.

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Name:_____

INCREMENT CURVE
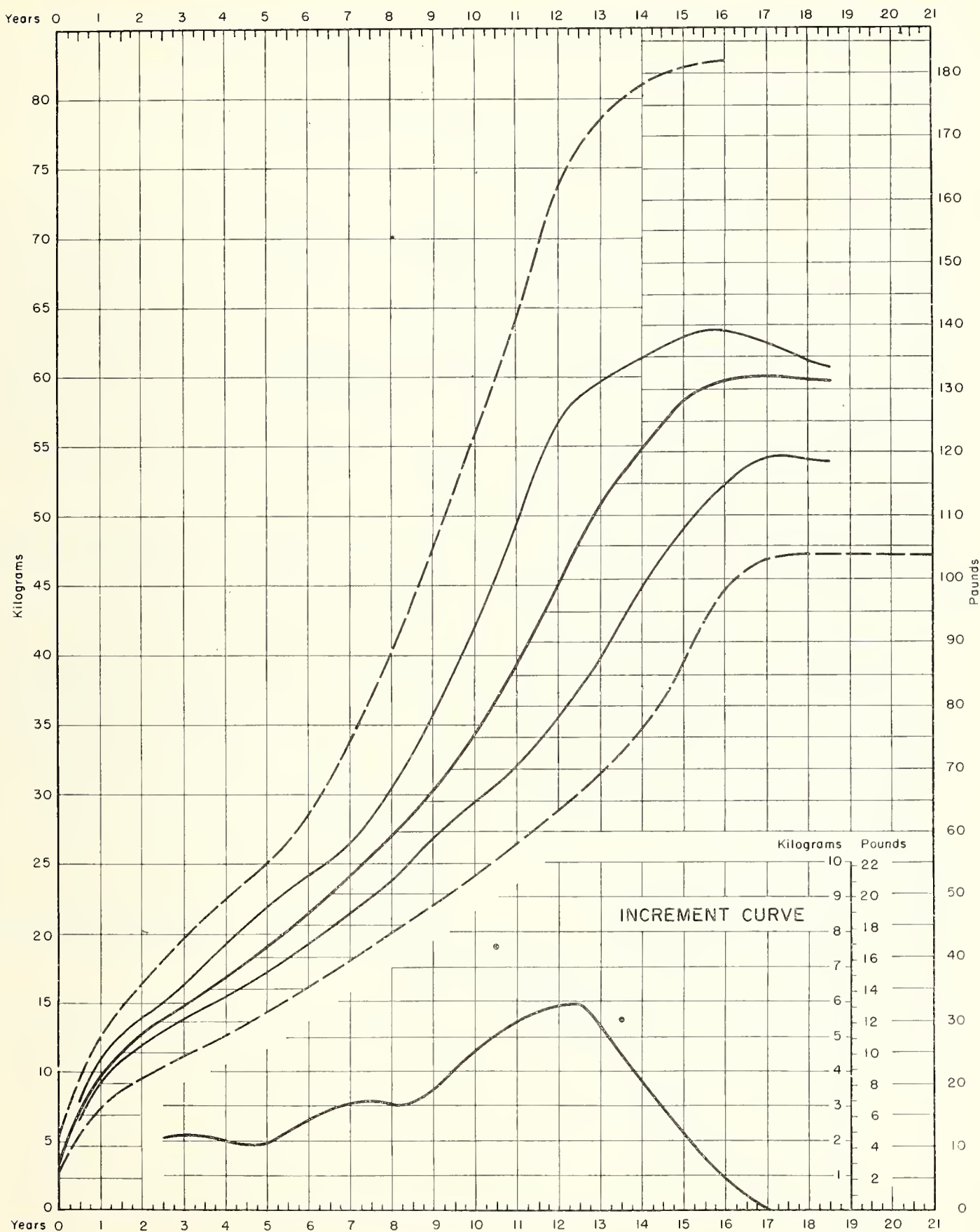
University of California, Institute of Child Welfare, Bayley 1954

Figure 8d.—Bayley's data relating weights of girls to rate of physical maturing.

Although the original data and the standards summarized in this compilation are based on white children only, the data for groups are biased more or less by such factors as the nationality and socioeconomic status of the population predominating in the area sampled. Time of the measurements has been included in the tables. Differences in national origin may account for some of the regional differences found, and must be kept in mind in work with individual children. In many of the samples studied in the United States the extent of bias due to nationality has remained undefined. In some studies children of other than "American" parentage or northern European ancestry have been omitted. Socioeconomic status is difficult to define and has been ignored in many of the studies.

Meredith (1939) demonstrated the effect of nationality on growth in stature of Boston children (fig. 9). Mean stature of boys and girls of north European descent exceeded the stature of those of Italian descent throughout all ages for which data were given, 7 to 17 years. Year by year, mean absolute gains were approximately the same for the two national groups, and curves for children of the same sex were characteristic of that sex. Marked variability in growth rate among *individuals* was reported for both national groups, and 50 percent of the children of both sexes changed stature positions within their group by 20 percentile points or more—some by as much as 50 to 60 percentiles. For boys the rank was constant between the ages of 7 and 11, and the fluctuations occurred primarily between the ages of 11 and 17. Occurrence of fluctuations for girls could not be checked with data from this study, because only a 2-year preacceleration period was included.

Matheny and Meredith (1947) compared the size of boys of Finnish and Italian ancestry at Hibbing, a mining town in Minnesota. Families of these boys had similar incomes and 80 percent of the fathers were unskilled laborers. Both height and weight data for these boys are presented in figure 10. Differences between the heights of these Finnish and Italian children were less than those for the Boston groups, but their socioeconomic conditions may have shown less variation. The weights for the two groups gave parallel curves, the Italian boys being lighter as well as shorter than the Finnish boys.

Studies in which socioeconomic status based on location of schools in economically favored or poor districts are available from at least two cities—Minneapolis in 1932–33 (Weisman 1935), and Philadelphia in 3 periods, 1925–27, 1932–34, and 1947–49 (Hundley and others 1955). Comparable values for 1932–34 are given in table 49. Height differences of 1.2 to 1.9 inches for boys, and 0.6 to 1.3 inches for girls, and weight differences of 2.3 to 2.5 pounds for boys and 2.9 to 3.2 pounds for girls were found between the children from favored and underprivileged areas.

TABLE 49. — *Comparison of heights and weights of 6-year-old [1] children from favored and underprivileged areas (1932–34)*

Condition and area	Boys		Girls	
	Heights	Weights	Heights	Weights
	Inches	*Pounds*	*Inches*	*Pounds*
Favored:				
Philadelphia_____	45.8	47.8	45.6	46.9
Minneapolis_____	47.7	48.7	47.0	48.0
Underprivileged:				
Philadelphia_____	44.6	45.5	44.3	44.0
Minneapolis_____	45.8	46.4	46.4	44.8

[1] Heights and weights of Philadelphia children were adjusted to age 76 months; data on Minneapolis children are unadjusted.

Studies comparing the influence of "racial, regional, socioeconomic, and secular factors" on stature and weight of 9- and 14-year-old boys in the United States were summarized by Meredith in 1941.

Figure 10.—Matheny and Meredith's data relating heights and weights of boys to nationality, Hibbing, Minn.

Figure 9.—Meredith's data relating heights of boys and girls to nationality, Boston, Mass.

Probably the earliest study on heights and weights of a large series of children in the United States was made in 1875 in the Boston schools by Bowditch (1877). Data from a later study in that area, 1922–34, were summarized by Shuttleworth (1939). Comparison of the heights and weights of boys and girls aged 5 to 18 years in these two studies, presented in figures 11a and 11b, shows that average gains were similar, but that both boys and girls were taller and heavier in the 1920's than in the 1870's.

Differences in stature over a span of nearly 50 years of 6- to 14-year-old children in Toronto, Ont., reported by Meredith and Meredith (1944), are illustrated in figure 12. Again, the average yearly increments for the 1892 and 1939 groups of the same sex are similar, but the differences in height between the two groups are generally greater for the Toronto children than for the children from the Boston area.

Meredith (1943) assembled data, presented in figure 13, which show that some of the increased stature for age over the years was apparent even in infancy, and could be attributed in part, perhaps, to better prenatal conditions.

Another evidence that Americans are getting taller in found in Bayley's 1954 report on comparison of heights of children with heights of their parents. Data on children for whom records were available over 18 years or longer were compared with data for their parents. Measurements on the parents were taken when the children were entered in the Berkeley Growth Study. In general, the boys at maturity were about 1 inch taller than their fathers, the girls 1.4 inches taller than their mothers. Correlation of the son's height with that of the father was significant after 3 years of age, with that of the mothers not until 13 years. The girls' heights were significantly correlated with their mothers' after the first few months, but not with their fathers' except possibly toward maturity.

The weights of the children in the Berkeley Growth Study averaged 4.2 pounds less for the boys than for their fathers, and 2.9 pounds less for the girls than for their mothers. These differences in weight might well be due to the fact the boys and girls at maturity were somewhat younger than were their parents when measured. The father-son correlations were generally low, reaching significance at the 5-percent level only at ages 15, 16, and 17 years. The mother-daughter correlations, however, showed strongly increasing similarities in weight through 16 years, reaching the 5-percent level of significance at 2 years, increasing to the 1-percent level by 6 years of age.

In general, these differences with time have been interpreted as probably related to such factors as advances in knowledge of dietary requirements, increases in immunization against disease and better medical care, improved housing and sanitary conditions, and greater emphasis on outdoor recreations.
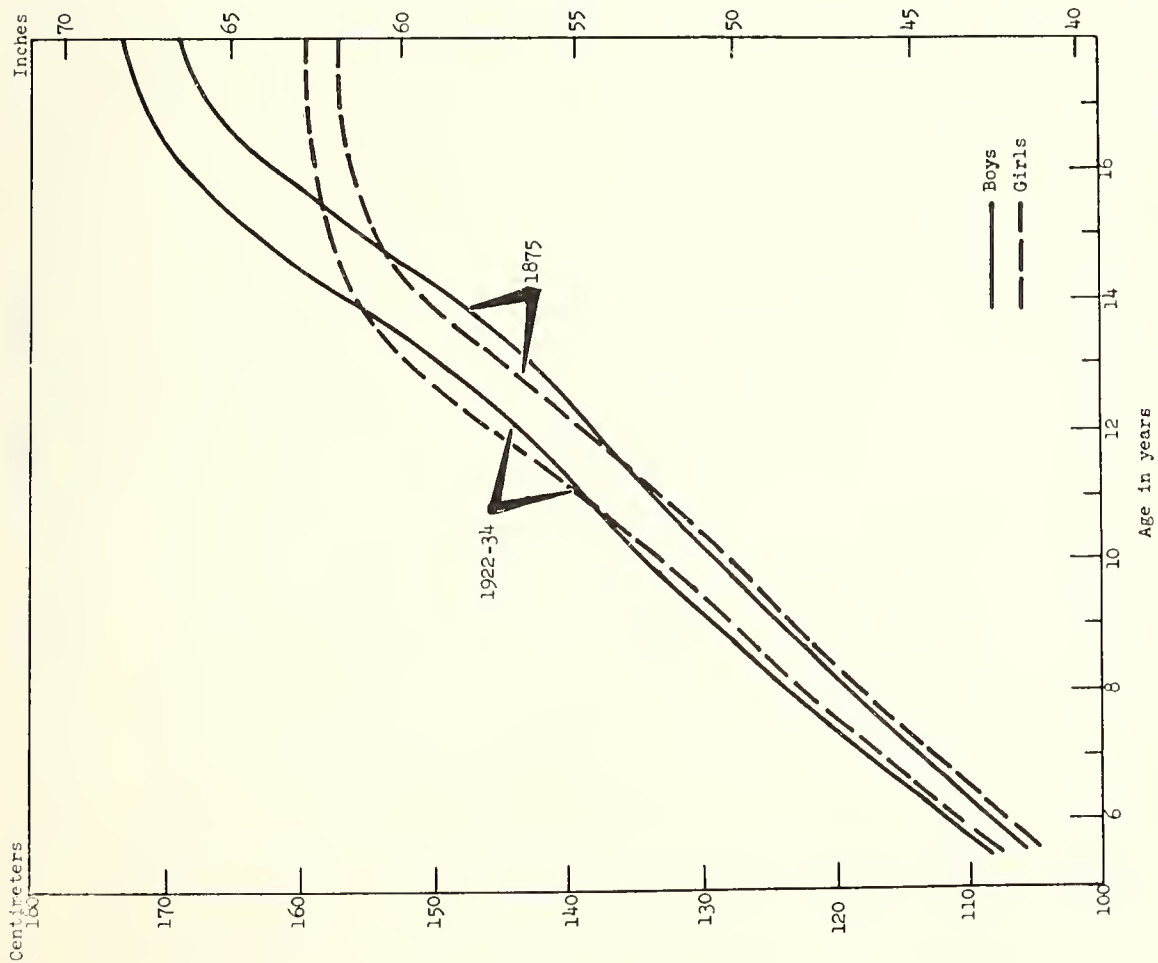
Figure 11a.—Heights of boys and girls in two periods about 50 years apart, Boston and vicinity.
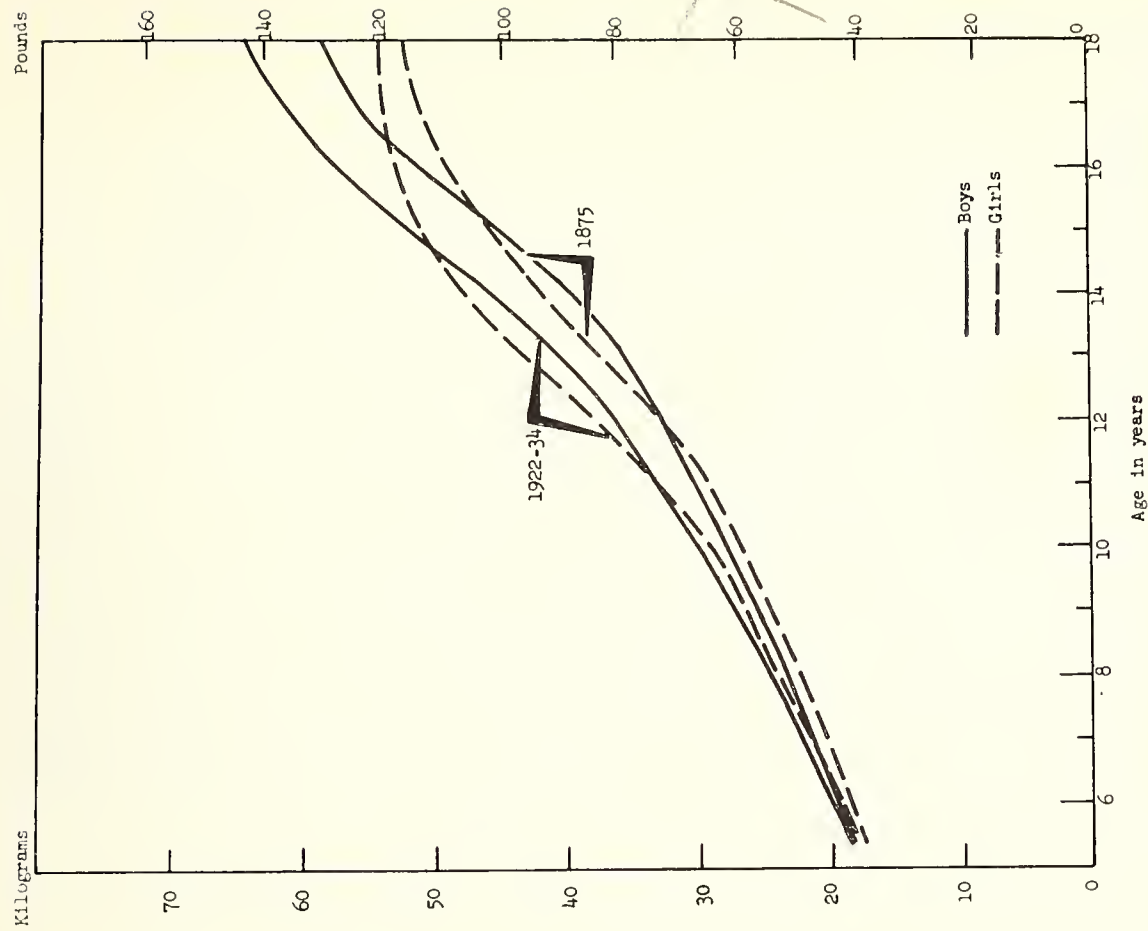
Figure 11b.—Weights of boys and girls in two periods about 50 years apart, Boston and vicinity.

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Figure 13.—Heights of infants in the United States over a 90-year span.

Infants, United States

1926-1941
1910-1925
1850-1909

Age in months

Inches
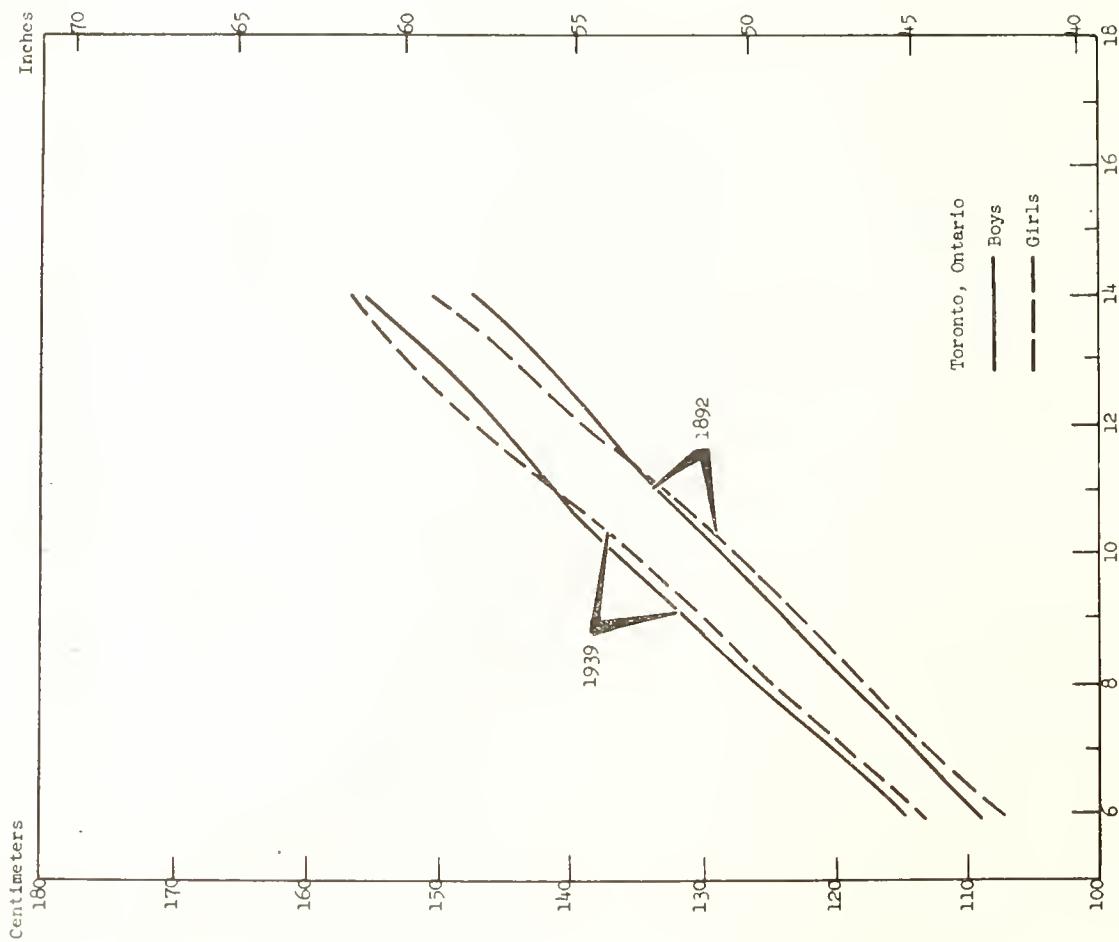
Centimeters

57 (2) 385

Figure 12.—Heights of boys and girls in two periods about 50 years apart, Toronto, Ontario.

Toronto, Ontario

Boys
Girls

1939

1892

Age in years

Inches

Centimeters

57 (2) 385

100

When attempts are made to compare values from studies differing in location, a number of problems arise. Adjustments can be made in graphs for differences in age groupings, that is, whether age was taken as last or nearest birthday, but adjustments for clothing are less satisfactory. Weight of clothing worn differs with age, decade, and locale. When children were measured without shoes, values for stature are comparable. Decade of measurement can be indicated, but other factors such as climate and national and socioeconomic background are usually ill-defined.

In Canada a nationwide study was made in 1953 (Pett 1955) covering a sample carefully selected by the area stratification plan, proportionate to population density. About 400 subjects were measured in each sex and age group. No comparable study has been made in the United States, but O'Brien (1941) carried out a study in 1937–39 in 16 States and the District of Columbia which included measurements of 147,088 white, American-born boys and girls. Comparison of these data is shown in figure 14. In spite of a 15-year differential in favor of the Canadian children, the average heights of the boys and girls in the two studies were fairly comparable for most ages up to about 15 years. Beyond that age the children in the United States were somewhat taller than their Canadian neighbors. Weights of children in these two studies were not strictly comparable, as the Canadian children were dressed (excluding shoes and outdoor apparel), while the children in the United States were nude when measured. Differences in weights which were found were probably largely due to weight of clothing.
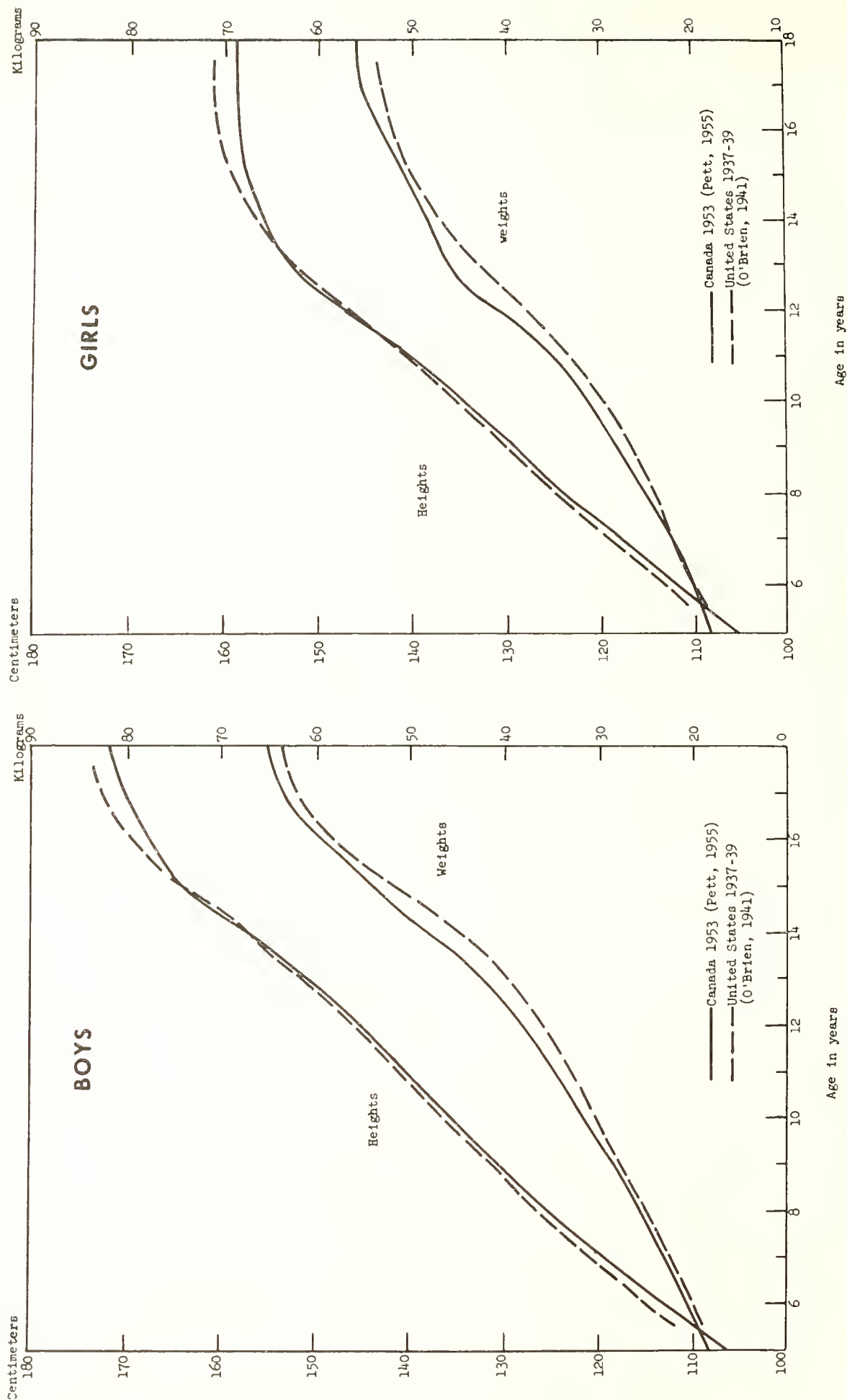
Figure 14.—Heights and weights of boys and girls, Canada and the United States.

Longitudinal studies, a series of measurements of the same children rather than different children, portray more comprehensively long-term trends or patterns of growth. Four studies from widely separated locations in the United States have afforded sufficient longitudinal or partially longitudinal data to show progressive growth of series of boys and girls. Two studies, one from the Boston area (Wilson and others 1935; Dearborn and others 1938[11]) and one from Berkeley (Tuddenham and Snyder 1954), recorded measurements on a series of public school children from ages 5 or 7 years to 16 or 18 years. The third study, in the Cleveland area (Simmons 1944), presents semilongitudinal measurements primarily for three groups of children from Greater Cleveland with above average economic and educational status; one from 3 months to 7 years, the second from 6 to 12 years, and the third from 11 to 16 years. The fourth study in Iowa City (Meredith 1941), was carried out over some 17 years on children from the University of Iowa experimental schools. Although the Iowa City data do not represent the same children throughout the period, many of them had repeated measurements throughout their years in school. In each group studied, there were measurements on more than 50 boys and 50 girls for each age.

Data were collected in the Boston area in 1922 to 1934, in Iowa City in 1920 to 1927 and again in 1930 to 1937, in the Cleveland area in 1931 to 1942, and in Berkeley in 1931 to 1947. Thus the data might be used to represent the size of children in different geographic areas of the United States during 2 decades.

Ages for the Boston-area girls were for the last birthday, for the Cleveland children on or near the birthday, and for the Berkeley and Iowa City children and the Boston-area boys, the nearest birthday. The children in the Boston and Cleveland studies were dressed except for shoes, coats, and sweaters; those in Berkeley and Iowa City, were undressed when measured.

The Berkeley, Cleveland, and Iowa City children were of north European ancestry, and the Boston-area children of north European, Italian, and Jewish ancestry.

As shown in figure 15a, of the children measured during the 1920's those from the Boston area were shorter than those from Iowa City by a fairly uniform amount of 4 to 5 cm. up to 12 years. Then the difference decreased gradually to 1.5 to 2 cm. at 16 years. The heights of the children from the Boston area paralleled those of the Berkeley and Cleveland children studied in the 1930's and 1940's, but were about 7 cm. less throughout the whole age range. There were some slight increases in heights of the Iowa City children between the 1920's and 1930's, significant at the 1-percent level for boys at ages 6, 8, 13, and 14 years and for girls at 5, 6, 8, 9, and 16 years. The children studied in the 1930's and 1940's in Cleveland and Berkeley were about the same height at corresponding ages, but were taller than the Iowa City children in the 1930's, the differences becoming greater as the children grew older.

A comparison of the weights of children in the four groups (fig. 15b) shows that in the 1920's children from the Boston area, even though dressed, were somewhat lighter than the Iowa City children up to 15 years of age, but weighed about the same at 15 and 16 years. The Iowa City children were slightly heavier in the 1930's than in the 1920's, but not significantly so when the differences in height were taken into consideration.

In the 1930's and 1940's the weights of the Berkeley and Cleveland children were similar, but when allowance is made for clothing, the Berkeley boys over 13 years old and girls over about 9 years were slightly heavier than the Cleveland children. The Iowa City boys were lighter than the Berkeley and Cleveland boys from 10 or 11 years of age, the difference amounting to as much as 4 to 5 kg. from age 13 years. The weights of the Iowa City girls differed only slightly from those of the Berkeley and Cleveland girls up to about 8 years of age, but the difference increased gradually with age, amounting to 4 to 6 kg. at 17 years.

The differences among the groups cannot be ascribed to only geographic location and doubtless are partially due to a number of other factors, some of which have been discussed earlier in this handbook.

[11] Data for the Boston-area boys were calculated from detailed data published by Dearborn and others (1938).
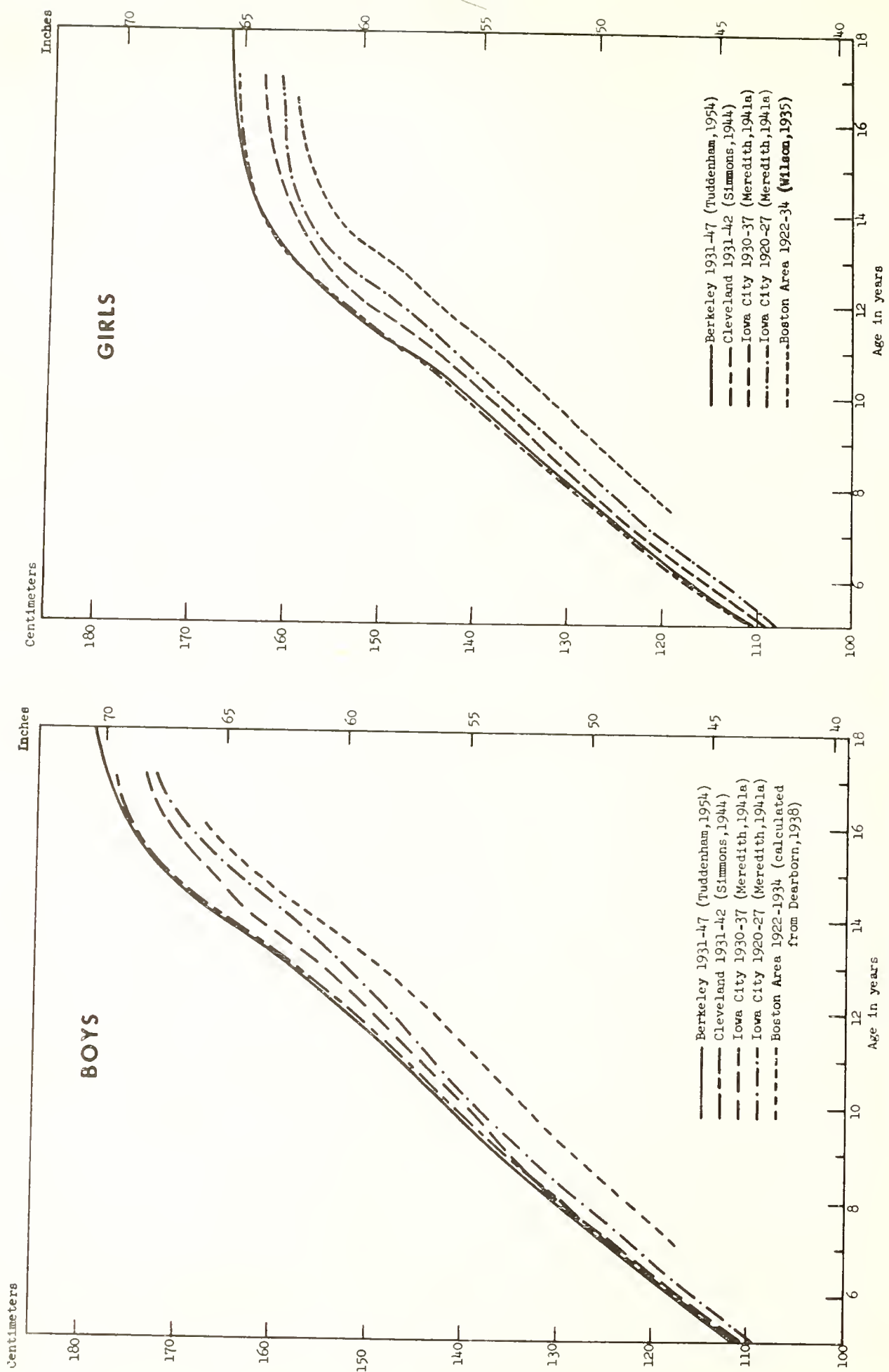
Figure 15a.—Longitudinal data representing two decades for heights of boys and girls from four areas.

104
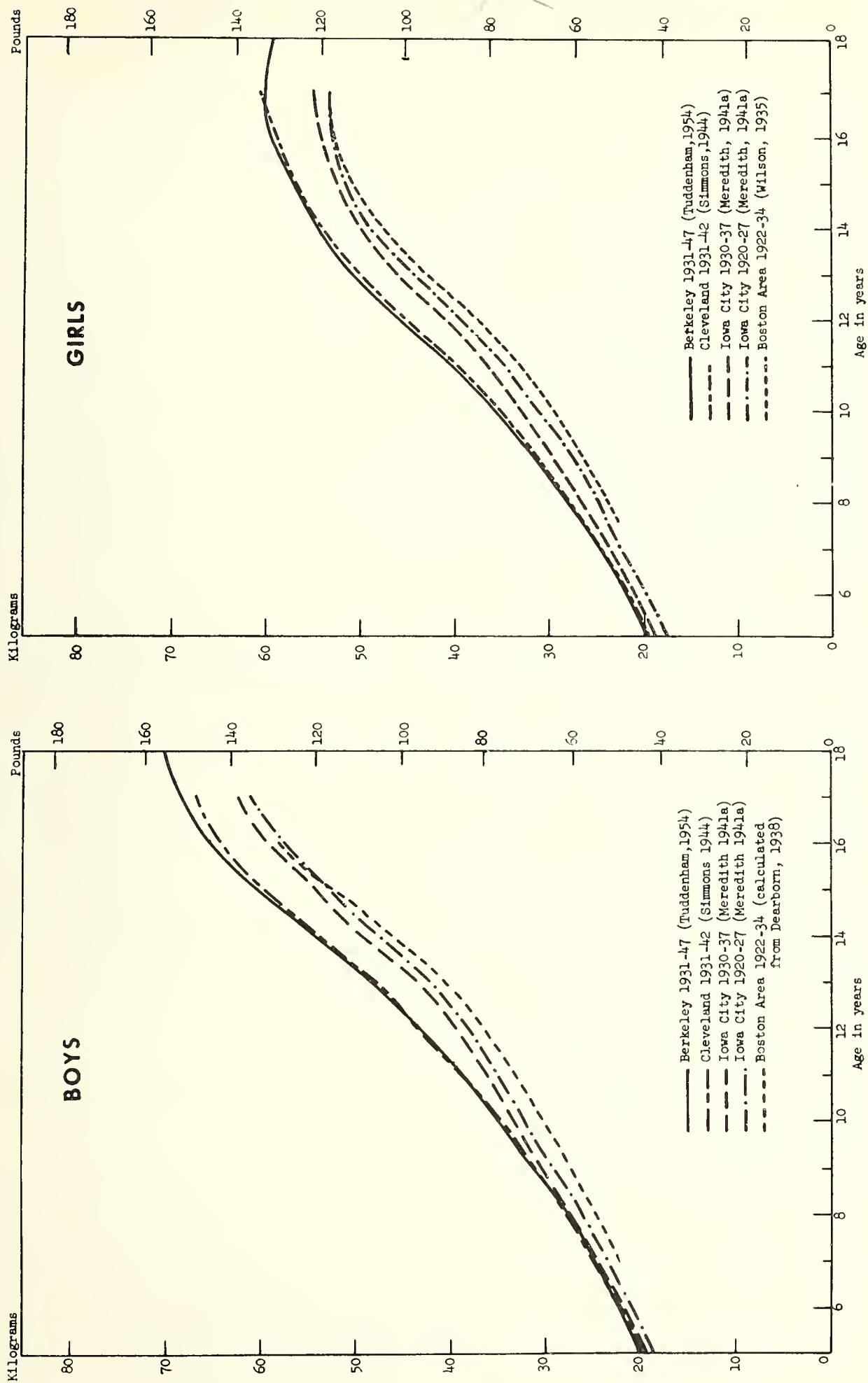
Figure 15b.—Longitudinal data representing two decades for weights of boys and girls from four areas.

Legend (Girls):
Berkeley 1931-47 (Tuddenham,1954)
Cleveland 1931-42 (Simmons,1944)
Iowa City 1930-37 (Meredith, 1941a)
Iowa City 1920-27 (Meredith, 1941a)
Boston Area 1922-34 (Wilson, 1935)

Legend (Boys):
Berkeley 1931-47 (Tuddenham,1954)
Cleveland 1931-42 (Simmons 1944)
Iowa City 1930-37 (Meredith 1941a)
Iowa City 1920-27 (Meredith 1941a)
Boston Area 1922-34 (calculated from Dearborn, 1938)

GIRLS

BOYS

Age in years

57 (2) 388

Section IV.—Annotated List of Literature References[12]

ABBOTT, O. D., TOWNSEND, R. O., FRENCH, R. B., and AHMANN, C. F.
1950. CARPAL AND EPIPHYSIAL DEVELOPMENT. ANOTHER INDEX OF NUTRITIONAL STATUS OF RURAL SCHOOL CHILDREN. Amer. Jour. Dis. Children 79: 69–81, illus.

> Data on 162 rural children in Florida are presented. Todd's standards and guide were used. The children were retarded.

ANDERSON, M., and GREEN, W. T.
1948. LENGTH OF THE FEMUR AND THE TIBIA. NORMS DERIVED FROM ORTHOROENTGENOGRAMS OF CHILDREN FROM 5 YEARS OF AGE UNTIL EPIPHYSIAL CLOSURE. Amer. Jour. Dis. Children 75: 279–290, illus.

> Methods and techniques are discussed. Values for 10, 50, and 90 percentiles for 5- to 18-year-old children from Boston, Mass., are given. Both proximal and distal epiphyses were measured.

BABCOCK, M. J., BRYAN, A. H., CLAYTON, M. M., and others.
1952. COOPERATIVE NUTRITIONAL STATUS STUDIES IN THE NORTHEAST REGION. II. PHYSICAL FINDINGS. N. J. Agr. Expt. Sta. Bul. 763, 28 pp.

> A table is presented showing the percentages of subjects having normal weights for heights, ± 4 percent, and those deviating by 5 to 9 percent, and by 10 percent and over from standard values given by Baldwin-Wood (to 16 years) and Davenport (16 years and over). Details of how measurements were made are not included in the bulletin. Individual height and weight values were received from W. R. Lewis at West Virginia University. From these data average values for age and sex were computed and are recorded in the average tables and list of references under the State of origin and the corresponding research leader as named in the bulletin.

BALDWIN, B. T.
1921. THE PHYSICAL GROWTH OF CHILDREN FROM BIRTH TO MATURITY. Iowa Univ. Studies in Child Welfare v. 1, No. 1, 411 pp., illus.

> Instruments and methods for making 18 body measurements are described. Data for Iowa infants, preschool children, and school children are presented and compared with data from the literature on children of same sex and age but of other nationalities. An annotated bibliography of 911 titles is included.

————
1924. THE USE AND ABUSE OF WEIGHT-HEIGHT-AGE TABLES AS INDEXES OF HEALTH AND NUTRITION. Amer. Med. Assoc. Jour. 82: 1–4.

> The author concludes that children under 10 years of age, 6 percent or more underweight, and those over 10 years, 8 percent or more underweight or 15 percent or more overweight for height and age, need medical attention.

————
1925a. WEIGHT-HEIGHT-AGE STANDARDS IN METRIC UNITS FOR AMERICAN-BORN CHILDREN. Amer. Jour. Phys. Anthrop. 8: 1–10.

> Reports the original averages of the height, weight, and age of 74,000 boys and 55,000 girls weighed nude, measurements reported in metric units. Data were from repeated annual or semiannual measurements of children from 12 schools located in New York, New Jersey, Pennsylvania, Illinois, Iowa, Maryland, and the District of Columbia.

*————
1925b. ANTHROPOMETRIC MEASUREMENTS. *In* Mental and Physical Traits of a Thousand Gifted Children, edited by L. M. Terman. Genetic Studies of Genius, v. 1, pp. 135–171, illus. Stanford Univ. Press.

> Among other tests made on a group of gifted children were 37 physical measurements, made in 1923, on 312 boys and 282 girls from Los Angeles, San Francisco, and Palo Alto.

———— BUSBY, L. M., and GARSIDE, H. V.
1928. ANATOMIC GROWTH OF CHILDREN: A STUDY OF SOME BONES OF THE HAND, WRIST, AND LOWER FOREARM BY MEANS OF ROENTGENOGRAMS. Iowa Univ. Studies in Child Welfare v. 4, No. 1, 88 pp., illus.

*FILLMORE, E. A., and HADLEY, L.
1930. FARM CHILDREN: AN INVESTIGATION OF RURAL CHILD LIFE IN SELECTED AREAS OF IOWA. 337 pp., illus. D. Appleton, New York.

> Children came from farm homes in Homewood township and Cedar Creek consolidated school district of east-central Iowa. They were measured in ordinary clothing with shoes removed.

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[12] Starred references are those from which data were taken for the tables of original data in Section I. For unpublished data, n. p. (not published) appears in place of the date of publication.

Baldwin, B. T., and Wood, T. D.

1923. WEIGHT-HEIGHT-AGE TABLES. TABLES FOR BOYS AND GIRLS OF SCHOOL AGE. Mother and Child, Suppl. to July issue, 5 pp.

Values are based on same data as in Baldwin's 1925 report, but are given in inches and pounds, for children clothed but without shoes, coats, or sweaters. These are the tables usually quoted and so have been used as standards for tables in this compilation.

Baum, M. P., and Vickers, V. S.

1941. ANTHROPOMETRIC AND ORTHOPEDIC EXAMINATIONS. A TECHNIQUE FOR USE WITH CHILDREN. Child Devlpmt. 12: 339–345.

The study at the center for research in child development of the Department of Hygiene of the Harvard School of Public Health is described. Procedures are given for making 17 measurements. The problems met in making such examinations and ways of solving them are discussed.

Bayer, L. M., and Gray, H.

1935. PLOTTING OF A GRAPHIC RECORD OF GROWTH FOR CHILDREN AGED FROM 1 TO 19 YEARS. Amer. Jour. Dis. Children 50: 1408–1417, illus.

Charts are based on Gray and Ayres' 1931 standards. Stature is related to weight or bicristal diameter.

—— and Newell, R. R.

1940. THE ASSESSMENT OF SKELETAL DEVELOPMENT OF THE HAND AND KNEE BETWEEN THE AGES OF 8 AND 14 YEARS. Endocrinology 26: 779–782, illus.

X-rays were made at 6-month intervals for 2 years on 10 normally developing children, 2 each aged 8, 9, 10, 11, and 12 years, in San Francisco. Difficulty was found in arranging the X-rays for a given child in chronological order without reference to their identification. Changes in less than a year could not be distinguished.

Bayley, N.

1943a. SKELETAL MATURING IN ADOLESCENCE AS A BASIS FOR DETERMINING PERCENTAGE OF COMPLETED GROWTH. Child Devlpmt. 14: 1–46, illus.

Subjects were 5th grade pupils from Oakland, Calif., schools. Skeletal ages of 17¼ years for boys and 16¼ years for girls are considered as "mature." In this study boys showed a spread of 4 years and girls a spread of 3.5 years in the chronological age at which they reached this state of maturity. Data are presented as percentages of mature height reached at given chronological age in early-, average-, and late-maturing groups.

1943b. SIZE AND BODY BUILD OF ADOLESCENTS IN RELATION TO RATE OF SKELETAL MATURING. Child Devlpmt. 14: 47–90, illus.

For 90 boys and 87 girls studied in Oakland, Calif., the girls on an average were larger than boys in all dimensions between 11 and 13.5 years. The boys overtook the girls in height at 13.5 years, in stem length and biacromial diameter at 14 years, and in bi-iliac diameter at 16 years. Late-maturing girls were larger than average for their skeletal age, and tended to be broader shouldered than average. Early-maturing boys were relatively large at all ages; late-maturing ones were small between 11 and 16 years. Early maturers were typically broadhipped; late maturers slenderhipped and longlegged.

1954. SOME INCREASING PARENT-CHILD SIMILARITIES DURING THE GROWTH OF CHILDREN. Jour. Ed. Psychol. 45: 1–21, illus.

Parent-child comparisons of heights and weights at maturity are presented.

1956. GROWTH CURVES OF HEIGHT AND WEIGHT BY AGE FOR BOYS AND GIRLS, SCALED ACCORDING TO PHYSICAL MATURITY. Jour. Ped. 48: 187–194, illus.

Curves in these charts were designed to match the growth rates of normal individual children. They were based on measurements of about 300 healthy California children, measured repeatedly from birth until 18 to 21 years of age. The data were grouped so that for each curve the measures at any point on the curve represent children alike in their physical maturity, as measured by X-rays of the hand and knee and by the percentage attained of each child's own adult stature.

—— and Davis, F. C.

1935. GROWTH CHANGES IN BODILY SIZE AND PROPORTIONS DURING THE FIRST 3 YEARS: A DEVELOPMENTAL STUDY OF 61 CHILDREN BY REPEATED MEASUREMENTS. Biometrika 27: 26–87, illus.

Measurements were made at monthly intervals for first 12 months, then at 15, 18, 24, 30, and 36 months. The study was made on babies of white English-speaking families from Berkeley, Calif. The mean family income was $2,844. The educational level of the fathers was 13.8 years, of the mothers 13.1 years. Nine measurements were made, of which height, weight, and stem length were considered most reliable.

BAYLEY, N., and PINNEAU, S. R.
1952. TABLES FOR PREDICTING ADULT HEIGHT FROM SKELETAL AGE: REVISED FOR USE WITH THE GREULICH-PYLE HAND STANDARDS. Jour. Ped. 40: 423–441, illus.

*BEAN, R. B.
1931. STATURE IN OLD VIRGINIANS. Amer. Jour. Phys. Anthrop. 15: 355–419, illus.

Data were collected in 1918–1930 on 3,000 subjects 6 to 60 years of age, both sexes, whose families had lived in Virginia for at least two generations. They were primarily of English, Scotch, German, and Dutch ancestry. (Stature throughout the world is also discussed.) Data for many different age groups are presented and for individual ages from 7 to 14 years.

*BENEDICT, F. G., and HENDRY, M. F.
1921. THE ENERGY REQUIREMENTS OF GIRLS FROM 12 TO 17 YEARS OF AGE. Boston Med. and Surg. Jour. 184: 217, 257, 282, 297, 329.

Heights and weights were incidental to basal metabolism tests.

*BISSETT, L., and LASLETT, H. R.
1932. A STUDY OF HEIGHT, WEIGHT, AND AGE AMONG HIGH SCHOOL BOYS. Jour. Juvenile Res. 16: 291–297.

Data represent 4,700 measurements on 1,850 boys 13 through 20 years old from the Oakland, Calif., Technical High School. Weights were without clothing.

*BLAIR, R.
1940. STANDARDS FOR THE ENERGY REQUIREMENTS OF PRESCHOOL CHILDREN. (Thesis, Ph. D., Univ. Chicago.)

In connection with the study of energy requirements, heights and weights were recorded. Children were weighed nude, and recumbent lengths were measured in almost all cases.

BOAS, F.
1932. STUDIES IN GROWTH. Human Biol. 4: 307–350, illus.

Growth of Hebrew and non-Hebrew children in Horace Mann School in New York are compared. Probably the earliest study relating age of most rapid growth rate to total period of growth. The earlier the maximum rate of growth the shorter is the total period, and the later adolescence the less intense is growth during the growing period.

1940. AGE CHANGES AND SECULAR CHANGES IN ANTHROPOMETRIC MEASUREMENTS. Amer. Jour. Phys. Anthrop. 26: 63–68.

Changes in head measurements among races and sexes, from 1909 to 1936, are reported. Data are presented for Hebrew children in New York and for many south Europeans from the literature.

BOWDITCH, H. P.
1872. COMPARATIVE RATE OF GROWTH IN THE TWO SEXES. Boston Med. and Surg. Jour. 10: 434–435, illus.

The curves of growth show periodic acceleration and retardation, occurring 2 to 3 years earlier in girls than in boys.

1877. THE GROWTH OF CHILDREN. Mass. State Bd. of Health Ann. Rpt. 8: 275–324, illus.

Children in Boston schools were measured without shoes, but in ordinary clothing. Parents were primarily "American," Irish, German, and English. Data are given for average height and weight for age, and for number and percentage of children of each age at each height and weight. Comparable data are given for Belgian, English, and German children. The author reported that children from the public and private Latin schools and from the Massachusetts Institute of Technology were superior in height and weight to the general run in the public schools. Children of American parentage were taller and heavier than those of foreign parentage.

1879. THE GROWTH OF CHILDREN: A SUPPLEMENTARY INVESTIGATION. Mass. State Bd. of Health Ann. Rpt. 10: 35–62, illus.

A tabulation is given of 1877 data according to occupation of the parents.

1891. THE GROWTH OF CHILDREN STUDIED BY GALTON'S METHOD OF PERCENTILE GRADES. Mass. State Bd. of Health Ann. Rpt. 22: 479–522.

Tables present the early Bowditch data (1877) in terms of percentiles.

*BOYD, E.
1941. OUTLINE OF PHYSICAL GROWTH AND DEVELOPMENT. 119 pp., illus. Burgess Pub. Co.

Supine stature and weight of Minneapolis infants and nursery school children from birth to 6 years of age are included in the tables. Values for other ages are quoted from Faber (1929), Richey (1937), and Diehl (1933).

BOYD, E.

1952. AN INTRODUCTION TO HUMAN BIOLOGY AND ANATOMY FOR FIRST YEAR MEDICAL STUDENTS. [65 pp.], illus. Child Research Council, Denver.

Height-weight tables based on Denver children are included.

1955. PICTORIAL AND GRAPHIC ANALYSIS OF THE BODY BUILD OF ONE BOY. Amer. Jour. Dis. Children 89: 332–340, illus.

Interesting techniques are used—seriation of outline tracings of photographs and enlargement of each to a common height (iconometography of Wilmer and Scammon).

*BOYNTON, B.

1936. THE PHYSICAL GROWTH OF GIRLS. A STUDY OF THE RHYTHM OF PHYSICAL GROWTH FROM ANTHROPOMETRIC MEASUREMENTS ON GIRLS BETWEEN BIRTH AND 18 YEARS. Iowa Univ. Studies in Child Welfare v. 12, No. 4, 105 pp., illus.

A companion study to Meredith's 1935 study on boys. There are 55,886 measurements of 22 types on 1,241 physically normal white girls. Parents were 90 percent from the United States, 60 percent "old American" stock. Fathers held mostly professional or managerial positions. The children were pupils in the University of Iowa experimental elementary and high schools.

*BROWN, A. P.

1936. COMPARATIVE SIZE OF RURAL AND URBAN UTAH SCHOOL CHILDREN AS DETERMINED BY THE WEIGHT-HEIGHT-AGE RELATIONSHIP. Utah Agr. Expt. Sta. Bul. 266, 22 pp., illus.

Data are reported on 12,913 rural children (from 21 of 29 counties in Utah) and 13,871 urban children (from Logan, Provo, and Salt Lake City) between the ages of 6 and 15. The children were measured without shoes and outer clothing.

*———— and MOSER, F. Y.

1942. NUTRITIONAL STATUS INDICES FOR RURAL AND URBAN UTAH SCHOOL CHILDREN. Child Devlpmt. 13: 101-112.

Data on additional children from Cache County and Logan are reported.

BRUCH, H.

1942. THE GRID FOR EVALUATING PHYSICAL FITNESS (WETZEL). APPLICATION TO CHILDREN WITH ABNORMAL BODILY DIMENSIONS. Amer. Med. Assoc. Jour. 118: 1289-1293, illus.

The grid was applied to 52 children. It was satisfactory for physical fitness, but assessment of "developmental age" did not agree with roentgenographically determined skeletal age. Basal metabolic rates, dependent on developmental levels, were also unreliable.

CHRISTOPHER, W. S.

1900. MEASUREMENTS OF CHICAGO SCHOOL CHILDREN. Amer. Med. Assoc. Jour. 35: 618-623, illus.

About 5,600 children in Chicago public schools were measured between March 1899 and April 1900. They were weighed and measured in ordinary schoolroom clothing, but heights were corrected for shoe height. Clothing was found to be equivalent to 2.8 to 8.2 percent of the gross weight of the child, usually 4 to 7 percent. The average for boys was 5.8 percent, for girls 5.5 percent. The parents were mostly American, in comfortable circumstances. The children were well fed and well clothed.

CLARK, G.

1930. DIFFERENCES IN MEASUREMENTS MADE IN NUDE AND CLOTHED CHILDREN BETWEEN 7 AND 9 YEARS OF AGE. Child Devlpmt. 1: 343-345.

Average weights of 97 boys and 67 girls 7 to 9 years old in Iowa City are reported, first with shoes, topcoats, and sweaters removed, then nude. Mean differences were 1.89 pounds for boys and 1.57 pounds for girls.

*CLAYTON, M. M.

1940. THE FOOD HABITS AND PHYSICAL CONDITION OF CHILDREN IN SELECTED COMMUNITIES IN MAINE. Maine Agr. Expt. Sta. Bul. 401, 154 pp., illus.

Areas selected for the survey were Mars Hill (northeast border), Jonesport (eastern tip), and Monmouth (southwestern part). Children were mostly of American parentage. Nine measurements were made on nude children aged 5 through 16 years. Details of methods are given.

1942. A STUDY OF THE MC CLOY METHOD FOR DETERMINING NORMAL WEIGHT. Child Devlpmt. 13: 215–226, illus.

The results of a 4-year study appeared to be reasonably accurate except in markedly overfat or emaciated individuals.

* Clayton, M. M.

1944. a 4-year study of the food habits and physical condition of grade-school children in newport, maine. Maine Agr. Expt. Sta. Bul. 430, pp. 81-203.

> Parents were mostly American or Canadian: 50 percent of the fathers were laborers; 29 percent, business or professional men; 10 percent, farmers; 6 percent, unemployed; and 5 percent, unclassified. Education of 48 percent of the fathers was elementary school or less, 21 percent attended high school, and 7 percent had some advanced training. Of the mothers 42 percent had elementary school education or less, 30 percent had some high school, 21 percent finished high school, and 7 percent had some advanced training. Children were measured (nude) in fall and spring; averages were used in this compilation.

*————

n. p. original data from the maine phase of the northeast regional nutritional status project ne-4, 1948–52. (See Babcock 1952.)

> Children were primarily urban junior high school students (8th and 9th grades) from Bangor and three nearby towns.

Collins, S. D., and Clark, T.

1929. physical measurements of boys and girls of native white race stock (third generation native born) in the united states. (physical measurement studies no. 1.) U. S. Pub. Health Serv. Rpts. 44: 1059-1083, illus.

> Data are given by years 6 through 15 for the entire group. Paper of Palmer and Collins (1935) reports same data by geographic areas.

Davenport, C. B.

1930. physical growth in the second decade. *In* Physical and Mental Adolescent Growth, Brush Foundation and Western Reserve Univ., Proc. Conf. on Adolescence, Oct. 17–18, pp. 5-19, illus.

> In addition to illustrating the average velocity of growth in stature for boys and girls, the author illustrates the wide variations in crests for individuals. Crests occurred at any time between 11 and 17, and over 1 to 2 years. The "mode of the average" was 14.5 years. An individual might show more than one slump, but the last one was marked and was over within a year.

*Dean, W. T.

1955. an effort to appraise the effect of fertilization of the land on the growth and physical condition of farm people ("konnarock study"). (Typed report. Va. Polytech. Inst. Library, Blacksburg, Va.)

> Data for rural white children aged 2-6 and 12-16 are presented. They came from Smyth, Green Cove, and Washington Counties in southwest Virginia.

*————

n. p. original data from subproject 2 of southern regional nutritional status project s-15, 1949-54.

> Data on heights and weights of town and rural white Blacksburg, Va., children 8 to 11 years old were secured. Children were weighed in light underwear. See next reference.

———— Davis, B. C., and McConnell, S. L.

1954. nutritional status of preadolescent boys and girls in the blacksburg school district. Va. Agr. Expt. Sta. Tech. Bul. 122, 31 pp., illus.

> The published report of the Blacksburg study above in which background and height-weight values in relation to standards were reported.

———— Sheffield, M. M., Harper, L. J., and Tate, M. T.

1953. growth trends of children in southwest virginia. Amer. Dietet. Assoc. Jour. 29: 1109-1112, illus.

> The published report of growth of children from the "Konnarock Study" (Dean 1955). Data are presented in relation to the Wetzel Grid. Numbers of children in each age range were not reported.

Dearborn, W. F., and Rothney, J. W. M.

1938. basing weight standards upon linear bodily dimensions. Growth 2: 197-212, illus.

> The authors consider types of body build as a relic of a psychological error and discuss the inadequacy of indices of body build because of difficulty in determining dividing lines. A formula is proposed for calculating weight from measurement of chest depth, chest width, standing height, and bi-iliac diameter which will predict weight within 5 pounds for boys or girls 14 to 17 years old but does not work for either sex under 14 years.

Dearborn, W. F., and Rothney, J. W. M.
1941. predicting the child's development. Sci-Art Pubs., 360 pp., illus. Cambridge, Mass.

A detailed description is given of the sample for the Harvard Growth Study; the methods used for measurements; nature of growth and development, including the relation of chronological, skeletal, and mental ages; the relationships in mental and physical growth, and some general conclusions from the study.

——— Rothney, J. W. M., and Shuttleworth, F. K.
1938. data on growth of public school children (from the material of the harvard growth study). Soc. Res. in Child Devlpmt. Monog. v. 3; No. 1, 136 pp.

Detailed individual data are given for 10 anthropometric measurements on 1,553 individuals over a 12-year period. Five to 13 sets of annual measurements are reported. Measurements were made at school, and only shoes, coats, and sweaters were removed. Summary data are presented in Shuttleworth's 1939 report.

*Dimock, H. S.
1935. a research in adolescence. I. pubescence and physical growth. Child Devlpmt. 6: 177-195, illus.

This study of 200 "normal" boys, pubescent at ages from 11 to 16 years, shows that pubescent age is more important than chronological age in determining the individual's height and weight. The most rapid gain is in the year during which a boy passes from pubescence to postpubescence regardless of age (13 to 15). The data for a given chronological age were combined for this compilation. The study was from the George Williams College in Chicago.

———
1937. rediscovering the adolescent. 277 pp., illus., New York.

Essentially the data published by Dimock in Child Development, 1935.

*Dreizen, S., Currie, C., Gilley, E. J., and Spies, T. D.
1953. the effect of nutritive failure on the growth patterns of white children in alabama. Child. Devlpmt. 24: 189-202, illus.

Data are reported on 2,404 normal children from the Birmingham district, ranging in age from 3 to 16 years. Data for 561 children showing clinical evidence of nutritive failure have not been included in the tables of this compilation.

Dunlop, D. G.
1943. the families of the child research council. a study of families whose children are similar to those in urban pediatric practice. Jour. Ped. 22: 111-120, illus.

The families were well above average for Denver or for the general population of the country in income levels, percentage of native-born parents, occupational status, and education, social, and cultural status. They were near average in family size and facilities for the children. See Duval (1942) for height-weight data.

Dupertuis, C. W., and Michael, N. B.
1953. comparison of growth in height and weight between ectomorphic and mesomorphic boys. Child Devlpmt. 24: 203–214, illus.

Ectomorphs from 4 to 17 years of age were consistently taller than mesomorphs, but mesomorphs were significantly heavier from 2 to 17. On the average, mesomorphs reached the peak in pubertal spurt in height and weight 1 year earlier than ectomorphs. Ectomorphs grew in height for a longer time, but mesomorphs grew faster, that is, at each age level the mesomorphs had a higher percentage of their adult height than did the ectomorphs.

*Duval, A. M.
1942. a study of the basal metabolism of normal children from 2 to 15 years inclusive. (Thesis, Ph. D., The Charles Dennison, M. D., Memorial Library, Univ. Colo. School Med., Denver.)

Data on heights and weights are presented as a part of the energy metabolism studies of children by the Denver Child Research Council. The children were measured in light clothing, without shoes. This report is an extension of the earlier study of Lewis, Kinsman, and Iliff (1937). Average values used in the height-weight tables in the thesis and used in this compilation include data from both reports.

*Dyar, E.
n. p. original data from the colorado phase of the western regional nutritional status project w-4, 1948-52. (Colo. Agr. Expt. Sta. in coop. with U. S. Dept. Agr. and U. S. Pub. Health Serv.)

Children came from Lake and El Paso counties.

*Eppright, E. S., and Sidwell, V. D.

1954. physical measurements of iowa school children. Jour. Nutr. 54: 543-556, illus.

The children comprised a statewide sample of public school children with the exception of those from one-room rural schools and from high schools in cities over 50,000 population. Ages ranged from 6 through 18 years. Chest breadth, bi-iliac diameter, and leg girth measurements are also reported.

*Esselbaugh, N., and Hard, M. M.

n. p. original data from the washington phase of the western regional nutritional status project w–4, 1948–52. (Wash. Agr. Expt. Sta. in coop. with U. S. Dept. Agr.)

Children came from Everett and Yakima areas. Only native born and reared children were included. In general, children were weighed and measured without clothes. Shy children wore light pajamas.

Faber, H. K.

1925. variability in weight for height in children of school age. Amer. Jour. Dis. Children 30: 328–335, illus.

Data to illustrate variability in weight and height of children are presented. Of 60,000 San Francisco school children, weighed without shoes, coats, or sweaters, 89, or 0.26 percent, were excluded as underweight and 550, or 1.6 percent, as overweight. Variability was greater for girls than for boys and increased after age 7 as age increased, especially with the overweight.

1929. a weight range table for children from 5 to 15 years of age. Amer. Jour. Dis. Children 38:758–761.

Tables given represent ranges of weights for given height, age, and sex based on 80 percent of the 60,000 San Francisco school children measured.

Flory, C. D.

1935. predicting puberty. Child Devlpmt. 6: 1–6.

Subjects were 80 girls from the University of Chicago Laboratory Schools, measured and X-rayed on or near their birthday. Osseous development was found to be a better predictor of puberty than any anthropometric measurement.

1936. osseous development in the hand as an index of skeletal growth. Soc. Res. in Child Devlpmt. Monog. v. 1, No. 3, 141 pp., illus.

The literature is reviewed and analysis of carpal growth is made—139 references are given.

*Follstad, M. S.

1938. growth of wyoming children over a 5-year period. (Thesis, M. S., Univ. Chicago.)

The 200 children included had lived in the Salt Creek oil field area for at least 5 years. The families represented all classes of labor. Most parents were born in the United States. The children wore no shoes or heavy clothing when they were weighed and measured.

Franzen, R.

1929. physical measures of growth and nutrition. Amer. Child Health Assoc., School Health Res. Monog. No. 2, 138 pp., illus.

There is disagreement among physicians on importance of each of 12 anthropometric traits. The author found better correlation of chest and hip measurements with weight than of height with weight. Description of techniques of measurements is given.

1934. selection of malnourished children. Amer. Jour. Dis. Children 47: 789–798.

Five hundred 11-year-old children in New York City were studied for weight and 5 skeletal traits. The best selection of malnourished children was based on arm girth (a), chest depth (c), and hip width (h).

*Freeman, R. G., Jr.

1933. skeletentwicklung und wachstum im alter von 2 bis 18 monaten, von 2 bis 7½ jahren und von 8 bis 14½ jahren. Anthrop. Anz. Jahrg. 10: 185–208.

The children were from the Child Development Institute, Horace Mann, Buckley, and Lincoln Schools in New York City. Twelve measurements were made. Data for the 2- to 18-month-old children are compared with other American, French, and German data; for the 2- to 7-year-old children, with other American, English, Belgian, German, Russian, Italian, and Japanese data; and for the 8- to 14-year-old children, with other American and English data.

FRIED, R., and MAYER, M. F.
1948. SOCIOEMOTIONAL FACTORS ACCOUNTING FOR GROWTH FAILURE IN CHILDREN LIVING IN AN INSTITUTION. Jour. Ped. 33: 444–456, illus.

Studies were made at Bellefaire, the Jewish Children's Home of Cleveland. The authors found that the most favorable conditions of shelter, grounds, food, schooling, and medical protection were not sufficient to assure good physical growth and development. The Wetzel grid was valuable as one guide to the coordinating work of the whole institution to meet the needs of the individual.

GAFAFER, W. M.
1936. RELATION OF PHYSICAL DEFECTS TO THE PHYSICAL GROWTH OF CHILDREN OF 21 STATES. PHYSICAL MEASUREMENT STUDIES NO. 3. U. S. Pub. Health Serv. Rpts. 51: 831–841, illus.

Data on children from the Palmer-Collins study (1935) are presented in two groups, one with and the other without physical defects. There were no consistent differences in rate of growth, and only slight differences in height, weight, trunk length, or vital capacity. The defects were principally carious teeth, defective tonsils and adenoids, goiter, enlarged glands, and defective vision.

GALLAGHER, J. R., and BROUHA, L.
1943. V. A SIMPLE METHOD OF EVALUATING FITNESS IN BOYS: THE STEP TEST. Yale Jour. Biol. and Med. 15: 769–779, illus.

Subjects included 6 boys 16 years old from Phillips Academy, Andover, Mass. Places of residence were not designated, and methods for height-weight measurements were not given, so that the data are not included in tables in section 1 of this compilation.

——— and GALLAGHER, C. D.
1953. SOME COMMENTS ON GROWTH AND DEVELOPMENT IN ADOLESCENTS. Yale Jour. Biol. and Med. 25: 334–348.

The authors report that in all aspects of growth wide variation in adolescent growth and development exists; normal range data bring more valid information than do averages; and progress in growth is more important than an adolescent's status at a given time.

GARN, S. M.
1952. INDIVIDUAL AND GROUP DEVIATIONS FROM "CHANNELWISE" GRID PROGRESSION IN GIRLS. Child Devlpmt. 23: 193–206, illus.

In study of 97 Boston girls of normal growth and development, the author found that there was a shift to B channels around 9 or 10 years of age, corresponding to the "stretching out period," and then a return to the M or A_1 channels around 13 or 14, corresponding to the "filling out period." Thus the Wetzel grid did not correct for changes in the female body during growth and maturation.

GAVIN, J. A., WASHBURN, S. L., and LEWIS, P. H.
1952. PHOTOGRAPHY: AN ANTHROPOMETRIC TOOL. Amer. Jour. Phys. Anthrop. (n.s.) 10: 331–353, illus.

Techniques are described, and the importance of the use of photography as a partner in collecting data is emphasized.

GOLDSTEIN, M. S.
1948. FRANZ BOAS' CONTRIBUTIONS TO PHYSICAL ANTHROPOLOGY. Amer. Jour. Phys. Anthrop. (n.s.) 6: 145–161, illus.

GRANDPREY, M. B.
1933. RANGE OF VARIABILITY IN WEIGHT AND HEIGHT OF CHILDREN UNDER 6 YEARS OF AGE. Child Devlpmt. 4: 26–35, illus.

The 10th, 25th, 50th, 75th, and 90th percentiles for heights and weights of children under 6 years of age were computed from Woodbury's frequency tables by the graphic technique described by Yule (Theory of Statistics, London, 1922). Tables present the 10th and 90th percentiles for weight and height for age, and for weight for height. Graphs present all 5 percentiles for weight for age, height for age, and weight for height for boys and girls separately.

GRAY, H.
1927. INCREASE IN STATURE OF AMERICAN BOYS IN THE LAST 50 YEARS. Amer. Med. Assoc. Jour. 88: 908–909, illus.

American-born boys of American-born parents were taller by more than 2 inches in 1927 than those reported by Bowditch in 1877–79.

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1948. PREDICTIONS OF ADULT STATURE. Child Devlpmt. 19: 167–175, illus.

Various methods are discussed—height for age, mid-parent rule, Bayley's bone-age, and Walford's transformation—all of which come within 2 to 3 percent of actual values.

GRAY, H.

1951. WEIGHT, HEIGHT, AGE TABLES FOR AMERICAN ADULTS AND CHILDREN. *In* The Cyclopedia of Medicine Surgery-Specialties 14: 991–998. F. A. Davis Co., Phila., Pa.

> The author urges that all measures of height and weight be net or corrected to give net weight at the time of measurement, and actual age in months be recorded. He also states that the importance of economic level, race, environment, season, time of day, meals, and types of build is difficult to assess properly, and hence in need of further study. Tables for preschool children are adaptations of those of Woodbury (1923), amended to give net weights throughout, and to give weight for height rather than age. Faber's values for school children are presented, amended by substracting 2 pounds for coat and sweater. Heights for age are presented for 1 to 19 years from Gray and Ayres (1931). The author considered 4 pounds as average weight for women's clothes, 8 pounds for men's.

*———— and AYRES, J. G.

1931. GROWTH AND PRIVATE SCHOOL CHILDREN (WITH AVERAGES AND VARIABILITIES BASED ON 3,110 MEASURINGS ON BOYS AND 1,473 ON GIRLS FROM THE AGES OF 1 TO 19 YEARS). Behavior Research Fund Monog. 282 pp., illus. Univ. of Chicago Press.

> Schools were located in Illinois, New York, Massachusetts, Pennsylvania, and California. The socioeconomic level of families was superior, the environment and health of the children good. Measurements were made in the nude.

———— and FABER, H. .

1940. INDIVIDUAL GROWTH RECORDS OF TWO HEALTHY GIRLS FROM BIRTH TO MATURITY. Amer. Jour. Dis. Children 59: 255–280, illus.

> Genetic histories are given but geographic residences are not indicated. The girls were measured monthly to 1 year and semi-annually thereafter. Rates of growth, calculated for 3–month intervals, varied widely even in health.

GREULICH, W. W.

1938. PART I. SOME ANATOMICAL ASPECTS. *In* A Handbook of Methods for the Study of Adolescent Children, by W. W. Greulich, H. G. Day, S. E. Lachman, and others. Soc. Res. in Child Devlpmt. Monog. v. 3, No. 2, 1–70, illus.

> The instruments, measurements of skeletal development, skin and associated structures, and genital changes associated with puberty are discussed.

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1941. SOME OBSERVATIONS ON THE GROWTH AND DEVELOPMENT OF ADOLESCENT CHILDREN. Jour. Ped. 19: 303–314, illus.

> Figures are for growth of some south German children, because the author considered that group as more homogeneous than American children.

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1950. THE RATIONALE OF ASSESSING THE DEVELOPMENT STATUS OF CHILDREN FROM ROENTGENOGRAMS OF THE HAND AND WRIST. Child Devlpmt. 21: 33–44, illus.

———— and PYLE, S. I.

1950. RADIOGRAPHIC ATLAS OF SKELETAL DEVELOPMENT OF THE HAND AND WRIST, BASED ON THE BRUSH FOUNDATION STUDY OF HUMAN GROWTH AND DEVELOPMENT INITIATED BY T. W. TODD. 190 pp., illus. Standford Univ. Press.

HARDING, V. [S.] V.

1952a. TIME SCHEDULE FOR THE APPEARANCE AND FUSION OF A SECOND ACCESSORY CENTER OF OSSIFICATION OF THE CALCANEUS. Child Devlpmt. 23: 181–184, illus.

> The centers appeared 1 to 1½ years before the menarche and were fused about 1 year after the menarche.

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1952b. A METHOD OF EVALUATING OSSEOUS DEVELOPMENT FROM BIRTH TO 14 YEARS. Child Devlpmt. 23: 247–271, illus.

> Tables 1 through 4 indicate the percentage of children having a particular osseous center at each age. Girls are ahead of boys in the appearance of these centers at birth as well as at subsequent ages. Tables 5 through 7 show the range for appearance of certain centers (10th, 25th, 75th, and 90th percentiles). Tables 8 and 9 offer a simple method of estimating osseous development from birth to 14 years. Table 10 shows the percentage of children with similar ratings from one age to another. It was found that children tend to maintain a fairly constant rate of osseous development over long periods of time.

*HARDY, M. C.

1938. FREQUENT ILLNESS IN CHILDHOOD, PHYSICAL GROWTH, AND FINAL SIZE. Amer Jour. Phys. Anthrop. 23: 241–260, illus.

> Children were from Joliet, Ill., measured under the auspices of the McCormick Memorial Fund. They represented all economic levels, second and third generation Americans, grandparents mostly from Northern Europe and British Isles. They were generally in fair to good physical condition. No difference in height and weight were found which could be related to illnesses.

HASTINGS, W. W.
1902. A MANUAL FOR PHYSICAL MEASUREMENTS FOR USE IN NORMAL SCHOOLS, PUBLIC AND PREPARATORY SCHOOLS, BOYS' CLUBS, AND YOUNG MEN'S CHRISTIAN ASSOCIATIONS, WITH ANTHROPOMETRIC TABLES FOR EACH HEIGHT OF EACH AGE FROM 5 TO 20 YEARS, AND VITALITY COEFFICIENTS. 95 pp., plus charts. Springfield, Mass.

This study was considered by Baldwin as the best summary from the anthropometric viewpoint published to that date. A review of "basic facts" on growth and development is reported from earlier studies by Bowditch, Peckham, Porter, and McDonald. Forms and instruments used in making physical examinations are presented. Tables are based on measurements of Omaha school children.

HENRY, N. B. (editor)
1944. PART I. ADOLESCENCE. SECTION I. PHYSICAL AND PHYSIOLOGICAL CHANGES IN ADOLESCENCE. Natl. Soc. for Study Ed. Yearbook 43, pp. 8–99, illus.

"Physical changes in adolescence," chapter II, by Greulich, and "Adolescent changes in body build," chapter III, by Bayley and Tuddenham, refer to studies already reported elsewhere by the authors and others.

*HUNDLEY, J. M., MICKELSEN, O., MANTEL, N., and others.
1955. HEIGHT AND WEIGHT OF FIRST GRADE CHILDREN AS A POTENTIAL INDEX OF NUTRITIONAL STATUS. Amer. Jour. Pub. Health 45: 1454–1461, illus.

Data are reported for children in first grade in 1925–27, 1932–34, and 1947–49 from a number of schools in Philadelphia. The children were grouped according to the urban areas in which they lived: I. Under-privileged economically, II. Economically favorable, and III. Variable economically. Data from groups I and II were averaged for the height-weight table of 6–year-old children in this compilation. For group III, boys and girls and white and Negro children were not designated.

JACKSON, R. L., and KELLY, H. G.
1945. GROWTH CHARTS FOR USE IN PEDIATRIC PRACTICE. Jour. Ped. 27: 215–229, illus.

These charts are based on data from 13,500 height and 11,100 weight observations of 1,500 Iowa City boys and 1,500 girls in the State University of Iowa well-infant laboratory, preschool laboratory, and elementary and high schools between 1920 and 1940. Weight charts give median, 16th, and 84th percentiles; height charts, mean and mean $\pm$ 1 standard deviation.

*JENSS, R. M., and SOUTHER, S. P.
1940. METHODS OF ASSESSING THE PHYSICAL FITNESS OF CHILDREN. U. S. Children's Bur. Pub. 263, 121 pp., illus.

Data for children 7 to 7½ years old from New Haven, Conn., are reported. Of the children included 46 percent were Italian, 18 percent early American, 36 percent other. About one-fourth of the families received public or private assistance. Data were reported by nationality but were combined for the height-weight tables for this compilation.

*JOHNSON, B. J.
1925. MENTAL GROWTH OF CHILDREN IN RELATION TO RATE OF GROWTH IN BODILY DEVELOPMENT. 160 pp., illus. E. P. Dutton and Co., New York.

Children were from New York City. Their parents were primarily American born, and somewhat above the average in socioeconomic status. Children were nude when measured.

*JOHNSTON, F. A.
1943. ADEQUACY OF A DIET EATEN BY CHILDREN 8 TO 11 YEARS OF AGE. Amer. Dietet. Assoc. Jour. 19: 416–419.

Children were living at the Mooseheart, Ill., home. Ages were given in months, but calculated as of last birthday for this compilation.

JONES, H. E., and BAYLEY, N.
1941. THE BERKELEY GROWTH STUDY. Child Devlpmt. 12: 167–173.

Plan of the study is described.

KELLY, H. J.
1937. ANATOMIC AGE AND ITS RELATION TO STATURE. Iowa Univ. Studies in Child Welfare v. 12, No. 5, 38 pp., illus.

———— and Redfield, J. E.
1941. PHYSICAL GROWTH FROM BIRTH TO MATURITY. Rev. Ed. Res. 11: 573–591.

Factors in growth are discussed. A bibliography of 163 references is appended.

Kimball, E. R.

1956. the pediatrician examines the mother and child—introducing a chart to record growth and performance. Amer. Med. Assoc. Jour. 160: 1033–1039, illus.

A chart is presented to record growth and performance in children. The height-weight-age standards for the 10th and 90th percentiles are given from Vickers and Stuart values from birth to 5 years, and Stuart-Meredith values from 5 to 10 years.

Knott, V. B.

1941. physical measurement of young children. a study of anthropometric reliabilities for children 3 to 6 years of age. Iowa Univ. Studies in Child Welfare v. 18, No. 3, 99 pp., illus.

Krogman, W. M.

1941. growth of man. Tabulae Biol., 963 pp., illus. Den Haag 20.

This is a review of the literature from 1926 to September 1938. Tables of data on "U. S. Whites" are given on pages 135 to 291.

Krogman, W. M.

1950a. a syllabus of the physical growth of the child. Phys. Anthrop. Yearbook 5: 280–299.

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1950b. a handbook of the measurement and interpretation of height and weight in the growing child. Soc. Res. in Child Devlpmt. Monog. v. 13, No. 3, 68 pp., illus.

Methods of measuring height and weight are discussed, and importance of ethnic origin is pointed out. The importance of study of growth of the individual is emphasized; the Wetzel grid is considered the best device available for such studies. Height and weight values from Gray and Ayres are given.

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1956. the physical growth of children. an appraisal of studies 1950–55. Soc. Res. in Child Devlpmt. Monog. v. 20, No. 1, 91 pp., illus.

This review is a supplement to Krogman's 1950 "syllabus" and "handbook," and other recent résumés on growth in childhood. It presents digests of height-weight data, evaluation and critique of trends and goals, and a selected bibliography of 222 items.

*Lamb, M. W., and Michie, J. M.

1954. basal metabolism of nineteen children from two to ten years old. Jour. Nutr. 53: 93–104.

As many as 5 measurements of height and weight are reported for children 3, 4, and 5 years of age measured in shorts. All children were applicants for admission to nursery school at Texas Technological College at Lubbock. No information is given on ancestry or socioeconomic status.

*Lantz, E.

n. p. original data from the new mexico phase of the western regional nutritional status project w–4, 1948–52. N. Mex. Agr. Expt. Sta. in coop. with U. S. Dept. Agr. and U. S. Pub. Health Serv.

The children came from Las Vegas and "Old Town" and represented both "Anglo" and "Spanish American" ancestry.

Leal, M. A.

1932. the relationship between height and physiological maturing. Jour. Ed. Res. 25: 168–177, illus.

Data for 2,143 school girls in grades 4 to 12 in Philadelphia, Pa., schools are given. Height values are given for age in three groups: I. Immature; II. more mature but previous to menarche; and III. those that have menstruated. Those in Group I were shortest for their age, and group III tallest.

Lewis, R. C., Kinsman, G. M., and Iliff, A.

1937. the basal metabolism of normal boys and girls from 2 to 12 years old, inclusive. Amer. Jour. Dis. Children 53: Part II, pp. 348–428, illus.

The plan of the study by the Child Research Council of Denver is outlined. Height-weight data, as well as data on basal metabolic rates, are summarized with additional cases in the report by Duval, 1942.

*Lloyd-Jones, O.

1940. california tall children. Amer. Jour. Dis. Children 60: 11–21.

The number of children for each age range, as reported here, was used for this compilation with the data on heights and weights in the following report.

* Lloyd-Jones, O.

1941. RACE AND STATURE; A STUDY OF LOS ANGELES SCHOOL CHILDREN. Res. Quart. 12: 83–97, illus.

Values used are for all white children examined in each age range. California-born children were slightly taller than others. Data are also given in the report for Negro, Mexican, and Japanese children.

Lucas, W. P., and Pryor, H. B.

1935. RANGE AND STANDARD DEVIATIONS OF CERTAIN PHYSICAL MEASUREMENTS IN HEALTHY CHILDREN. Jour. Ped. 6: 533–545.

Measurements include head, face, ear, interpupillary space, neck, and trunk. Values are given for 5,749 cases aged 6 months to 15 years. The children were American born, middle class, from San Francisco.

Lurie, L. A., Levy, S., and Lurie, M. L.

1943. DETERMINATION OF BONE AGE IN CHILDREN. A METHOD BASED ON A STUDY OF 1,129 WHITE CHILDREN. Jour. Ped. 23: 131–140, illus.

X-rays of the hand, wrist, elbow, pelvis, foot, and ankle are considered adequate for determining bone age of a child. Girls from the Child Guidance Home in Cincinnati, Ohio, showed definite acceleration in bone growth or development compared with boys.

Mann, A. W., Dreizen, S., Pyle, S. I., and Spies, T. D.

1948. THE RED GRAPH AND THE WETZEL GRID AS METHODS OF DETERMINING THE SYMMETRY OF STATUS AND PROGRESS DURING GROWTH. Jour. Ped. 32: 137–150, illus.

X-rays are used in the red graph method (see Pyle 1948). The developmental age (Wetzel) and skeletal age (Todd) were seldom identical, and are not interchangeable measures of a stage of maturation. When used together, more developmental interrelations of bone and of soft parts are revealed.

Maresh, M. M.

1943. GROWTH OF THE MAJOR LONG BONES IN HEALTHY CHILDREN: A PRELIMINARY REPORT ON SUCCESSIVE ROENTGENOGRAMS OF THE EXTREMITIES FROM EARLY INFANCY TO 12 YEARS OF AGE. Amer. Jour. Dis. Children 66: 227–257, illus.

An extension of this study is given in the author's 1955 report.

1955. LINEAR GROWTH OF LONG BONES OF EXTREMITIES FROM INFANCY THROUGH ADOLESCENCE, CONTINUING STUDIES. Amer. Jour. Dis. Children 89: 725–742, illus.

Tables of percentiles and observed ranges for roentgenographic lengths of arm and leg bones (humerus, radius, ulna, femur, tibia, and fibula) are given for boys from 2 months to 18 years and for girls from 2 months to 16 years. Some children were studied from 2 months to 12 years, others from 10 to 16 or 18 years. There were 175 subjects, with more than 10 to 25 X-rays per person. The study is being continued with the aim of having a series covering from birth to 25 years. Tables for Boyd's tentative standards for standing and sitting heights are also given for boys and girls from 2 to 18 years. (See Boyd 1952.)

*———— and Washburn, A. H.

1938. SIZE OF THE HEART IN HEALTHY CHILDREN: ROENTGEN MEASUREMENTS OF THE CARDIAC AREA AND TRANSVERSE DIAMETER FOR 67 CHILDREN BETWEEN BIRTH AND THE AGE OF 6 YEARS. Amer. Jour. Dis. Children 56: 33–60, illus.

X-rays were made for infants and young children in supine position—for children 3 years of age or older, in dorsoventral position. Weight and height were measured at each examination. Details on measurement of heart size and findings are given. Study was made under the direction of the Denver Child Research Council.

* Marlatt, A. L.

n. p. ORIGINAL DATA FROM THE KANSAS PHASE OF THE NORTH CENTRAL REGIONAL NUTRITIONAL STATUS PROJECT NC–5, SUBPROJECT 2, 1948–52. (Kans. Agr. Expt. Sta. in coop. with U. S. Dept. Agr.)

Data were for 8- through 13-year-old children from 18 representative public schools in central Kansas. Children were weighed in indoor clothing and weights calculated to nude values.

Marshall, E. L.

1937a. THE OBJECTIVITY OF ANTHROPOMETRIC MEASUREMENTS TAKEN ON 8- AND 9-YEAR-OLD WHITE MALES. Child Devlpmt. 8: 249–256.

This study is similar to Meredith's (1936), but with different observers. The objectivity compares favorably with the reliability.

1937b. A REVIEW OF AMERICAN RESEARCH ON SEASONAL VARIATION IN STATURE AND WEIGHT. Jour. Ped. 10: 819–831.

Results from various studies are not uniform.

MARTENS, E. J., and MEREDITH, H. V.

1942. ILLNESS HISTORY AND PHYSICAL GROWTH. I. CORRELATION IN JUNIOR PRIMARY CHILDREN FOLLOWED FROM FALL TO SPRING. Amer. Jour. Dis. Children 64: 618–630.

A group of 54 boys and 36 girls between 4 and 6 years of age in Iowa City were studied over a 6-month period during the school years 1937 to 1940. Fourteen body measurements were made in fall and spring. Analysis of amount of illness for children underweight by McCloy norms gave no indication of association. Children with exceptionally high percentages of absences showed rates of growth just slightly below the averages for the total group.

MARTIN, E. A.

1954. ROBERTS' NUTRITION WORK WITH CHILDREN. 527 pp., illus. Univ. Chicago Press.

This is the most extensive recent discussion of child nutrition available. It summarizes in table V the early American growth studies (1872–1914) and in table VI the more recent ones (1917–53). Chapters III and IV provide an excellent starting point for the general study of physical growth.

*MARTIN, J. M.

1948. HEIGHT AND WEIGHT OF ELEMENTARY SCHOOL CHILDREN AS AN INDEX OF NUTRITION. (Thesis, M. S., Univ. Ala.)

Subjects were rural white children from 3 schools within 18 miles of Tuscaloosa. Their fathers were primarily miners or unskilled laborers. Measurements were made on nude children.

MARTIN, W. E.

1953. BASIC BODY MEASUREMENTS OF SCHOOL AGE CHILDREN. U. S. Dept. Health, Education, and Welfare, Office of Education, 74 pp., illus.

This handbook was prepared for school officials, architects, and design engineers in planning school buildings, furniture, and equipment. Measurements of height and weight of boys and girls 4 to 17 years of age were taken from published reports of 11 studies on child growth and development. Fifty-one other measurements are tabulated, primarily from O'Brien's 1941 report and the Brush Foundation study in Cleveland.

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1954. THE FUNCTIONAL BODY MEASUREMENTS OF SCHOOL AGE CHILDREN. Natl. School Serv. Inst., Chicago. 90 pp., illus.

A sample of 3,318 children from 10 elementary and secondary schools in southern Michigan between Ann Arbor and Detroit were measured. More detailed data are given in the 1955 report.

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1955. CHILDREN'S BODY MEASUREMENTS FOR PLANNING AND EQUIPPING SCHOOLS. U. S. Dept. Health, Education, and Welfare, Office of Education, Spec. Pub. 4, 113 pp., illus.

This handbook was prepared for use by school officials and architects. It contains information on 130 measurements, for boys and girls, distributed by school grade and age. The children are those described in the 1954 study above. Roughly 88 percent of the children were white, 12 percent Negro, 0.7 percent of other ethnic origin. Measurements were made with shoes, but average heel heights were given. Height values used in this compilation are values computed without shoes.

MASSLER, M.

1945. CALCULATION OF NORMAL WEIGHT. Child Devlpmt. 16: 111–118, illus.

Values were based on age, height, chest circumference, and specific gravity.

——— and SUHER, T.

1951. CALCULATION OF "NORMAL" WEIGHT IN CHILDREN (BY MEANS OF NOMOGRAMS BASED ON SELECTED ANTHROPOMETRIC MEASUREMENTS). Child Devlpmt. 22: 75–94, illus.

Weight, height, and chest, neck, and calf circumferences were measured for children in Mooseheart, Ill.

*MATHENY, W. D., and MEREDITH, H. V.

1947. MEAN BODY SIZE OF MINNESOTA SCHOOL BOYS OF FINNISH AND ITALIAN ANCESTRY. Amer. Jour. Phys. Anthrop. (n.s.) 5: 343–355.

Data are for 6- to 17-year-old boys from 30 communities within 50 miles of Hibbing—1,102 of Finnish and 884 of Italian parentage. Annual incomes in 1938–39 were $1,500 or less for 84 percent of the families and over $2.000 for only 4 percent. Fathers of 80 percent of the boys were unskilled. Subjects were nude during examination. Data were combined for the height-weight tables in section I of this compilation, but separate values are shown in figure 11.

McCLOY, C. H.

1936. APPRAISING PHYSICAL STATUS: THE SELECTION OF MEASUREMENTS. Iowa Univ. Studies in Child Welfare v. 12, No. 2, 126 pp., illus.

Individual differences in physical constitution and criteria for selection of measurements are discussed, as well as measurements for prediction of normal weight, fat and subcutaneous tissue, limb girth, . . . skeletal maturation. Landmarks and techniques are described.

McCloy, C. H.
1938. APPRAISING PHYSICAL STATUS: METHODS AND NORMS. Iowa Univ. Studies in Child Welfare v. 15, No. 2, 260 pp., illus.

A formula is given for computing normal weight from height, chest girth, hip width, and knee width. A list of 20 measurements is suggested, followed by 12 more that should be computed. A table of norms is given.

*McKay, H.
1930. BASAL METABOLISM OF YOUNG WOMEN. Ohio Agr. Expt. Sta. Bul. 465, 37 pp., illus.

Height-weight data are incidental to the study of basal metabolism. Ninety-one Ohio girls aged 14 to 18 years acted as subjects.

*Meredith, H. V.
1935. THE RHYTHM OF PHYSICAL GROWTH. A STUDY OF 18 ANTHROPOMETRIC MEASUREMENTS ON IOWA CITY WHITE MALES RANGING IN AGE BETWEEN BIRTH AND 18 YEARS. Iowa Univ. Studies in Child Welfare v. 11, No. 3, 128 pp., illus.

This is a companion study to Boynton's 1936 study on girls. The report is based on 90,000 measurements of 18 types on 1,243 boys. The parents were 90 percent from the United States, 4.5 percent from Canada and the British Isles, 3.4 percent from northern Europe, and a few from southern Europe. Fathers were primarily professional or managerial—only 3.2 percent were laborers. Children were nude for measurements.

1936a. PHYSICAL GROWTH OF WHITE CHILDREN. A REVIEW OF AMERICAN RESEARCH PRIOR TO 1900. Soc. Res. in Child Devlpmt. Monog. v. 1, No. 2, 83 pp.

1936b. THE RELIABILITY OF ANTHROPOMETRIC MEASUREMENTS TAKEN ON 8- AND 9-YEAR-OLD WHITE MALES. Child Devlpmt. 7: 262-272.

Details of 15 measurements and examination procedures are presented. The author considers that stature should be measured bimonthly; bi-iliac diameter, leg girth, and bitrocanteric diameter, quarterly; sitting height, thoracic circumference, thigh girth, forearm girth, and upper arm girth, semiannually; bicondylar diameter of the femur and biacromial diameter, annually; and bicondylar diameter of the humerus, biannually.

1936c. THE PREDICTION OF STATURE OF NORTH-EUROPEAN MALES THROUGHOUT THE ELEMENTARY SCHOOL YEARS. Human Biol. 8: 279-283.

This is a study of 263 boys from environs of Boston from 1923 to 1928.

1939a. LENGTH OF HEAD AND NECK, TRUNK, AND LOWER EXTREMITIES OF IOWA CITY CHILDREN AGED 7 TO 17 YEARS. Child Devlpmt. 10: 129-144, illus.

1939b. STATURE OF MASSACHUSETTS CHILDREN OF NORTH EUROPEAN AND ITALIAN ANCESTRY. Amer. Jour. Phys. Anthrop. 24: 301-346, illus.

Children of north European descent were taller than those of Italian descent at all ages from 7 to 17 years. Year by year mean absolute gain was approximately the same for the two racial groups. Marked individual differences were found in annual increases. Fifty percent of both sexes changed stature positions in the group by 20 percentile points or more, some by as much as 50 to 60 percentile points, during growth.

*1941a. STATURE AND WEIGHT OF PRIVATE SCHOOL CHILDREN IN TWO SUCCESSIVE DECADES. Amer. Jour. Phys. Anthrop. 28: 1-40.

Data are from records of children 5 to 17 years old from the University of Iowa experimental elementary and high schools. Differences in stature found between boys 6, 8, 13, and 14 years, and girls at 5, 6, 8, 9, and 16 years in the two decades were statistically significant. Differences in weight were also significant, but not significant in relation to corresponding stature.

1941b. STATURE AND WEIGHT OF CHILDREN OF THE UNITED STATES WITH REFERENCE TO THE INFLUENCE OF RACIAL, REGIONAL, SOCIOECONOMIC AND SECULAR FACTORS. Amer. Jour. Dis. Children 62: 909-932.

Primarily data from the literature. Those pertaining to white children are included elsewhere under references to original articles.

Meredith, H. V.

1943. physical growth from birth to 2 years: i. stature. a review and synthesis of north american research for the period 1850–1941. Iowa Univ. Studies in Child Welfare, v. 19, 337 pp.

Part I presents an analysis of data relating secular change, sex, socioeconomic, and race differences, and effect of illness and dietary treatments to the stature of young children. Part II presents an annotated bibliography of studies for this age group from 1850 through 1941. The appendix contains summary tables of data displaying central tendency and variability values for stature at nine infancy ages.

1947. length of upper extremities in homo sapiens from birth through adolescence. Growth 11: 1–50. illus.

1948. body size in infancy and childhood: a comparative study of data from okinawa, france, south africa, and north america. Child Devlpmt. 19: 179–195.

Findings are brought together from studies on Okinawans; South African Bantu-speaking Negroes; North American Negroes; American Chinese and Japanese in California; Alaskan Eskimos; Mexicans in California, Texas, and Mexico; Navaho and Pueblo Indians of New Mexico and Arizona; European whites in Marseilles, France; and North American whites of the United States and Canada. Analyses were made of stature and weight at birth, and at 3, 6, 7, 8, 9, and 10 years of age. References are given to origin of all data used.

1949a. height and weight of private school children in three successive decades. School and Soc. 70: 72–73.

Data are for 7-year-old Iowa City children (boys and girls together) for 1920–27, 1930–37, and 1940–47. Average heights were 47.8, 48.4, and 48.9 inches, respectively; average weights were 50.6, 53.1, and 55.1 pounds. Separate data for boys and girls in the first 2 decades were reported in an earlier paper, 1941a.

1949b. "a physical growth record" for use in elementary and high schools. Amer. Jour. Pub. Health 39: 878–885, illus.

A description is given of the development of the NEA–AMA booklets for physical growth records, and the forms are illustrated.

1950. body size norms for children 4 to 8 years of age. Jour. Ped. 37: 183–189.

Norms are given for chest, abdomen, arm girth, leg girth, shoulder width, hip width, stem length, upper limb length, and lower limb length.

1951a. relation between socioeconomic status and body size in boys 7 to 10 years of age. Amer. Jour. Dis. Children 82: 702–709.

Of boys of north European ancestry living in the United States or Canada, those with professional or managerial parents were taller (1 inch) and heavier (3¼ pounds) than those with semiskilled or unskilled parents. This trend was greater at 10 years than at 7 years. A similar study between "wealthy" and "poor" school children showed the wealthy more than 1 inch taller and almost 3 pounds heavier.

1951b. size and form of boys of usa-north european ancestry born and reared in oregon. Growth 15: 39–55.
These data are included in the 1953 report on a large group of children.

1955a. a longitudinal study of change in size and form of the lower limbs on north american white schoolboys. Growth 19: 89–106. illus.

This report pertains to growth of the lower extremities in 70 nonpathologic white boys examined annually from age 5 years to 11 years. Lower limb length. leg girth. and leg girth as percentage of lower limb length were studied. Measurements were made in 1940–54 on two groups of Iowa City boys, primarily of northwest European ancestry. from professional and business proprietor groups.

1955b. longitudinal anthropometric data in the study of individual growth. In Dynamic Anthropometry, edited by E. W. Count. N. Y. Acad. Sci. Ann. 63: 510–527, illus.

The author emphasizes the importance of minimizing chance errors, need of constant vigilance and objective team work to maintain efficiency of measurements, and importance of timing measurements at or near birthdays or half-year birthdays rather than using extrapolation.

MEREDITH, H. V.

1955c. MEASURING THE GROWTH CHARACTERISTICS OF SCHOOL CHILDREN. Jour. School Health 25: 267–273.

The author considers growth norms useful for description or for screening, but not for evaluation. Selection of norms which portray in correct perspective the growth characteristics of pupils with whom they deal is important.

———— and CARL, L. J.

1946. INDIVIDUAL GROWTH IN HIP WIDTH: A STUDY COVERING THE AGE PERIOD FROM 5 TO 9 YEARS BASED UPON SERIATIM DATA FOR 55 NON-PATHOLOGIC WHITE CHILDREN. Child Devlpmt. 17: 157–172, illus.
Measurements were made on Iowa City children.

———— and CULP, S. S.

1951. BODY FORM IN CHILDHOOD: RATIOS QUANTITATIVELY DESCRIBING FOUR SLENDER-TO-STOCKY CONTINUA ON BOYS FOUR TO EIGHT YEARS OF AGE. Child Devlpmt. 22: 3–14.

Slenderness and stockiness of body stem and upper and lower limbs were measured for boys in Iowa City in 1937–39, and others in Eugene, Oreg., in 1950.

———— and MEREDITH, E. M.

1944. THE STATURE OF TORONTO CHILDREN HALF A CENTURY AGO AND TODAY. Human Biol. 16: 126–131.

Comparison of stature of elementary school children in Toronto in 1892 and 1939 showed that a 6-year-old child was 5.0 cm. shorter in 1892 than a 6-year-old in 1939. At 9 years the difference was about 7.5 cm. The greatest difference was found at 12 or 13 years for girls (9 cm.) and 13 or 14 for boys (about 8.6 cm.).

———— and MEREDITH, E. M.

1950. ANNUAL INCREMENT NORMS FOR 10 MEASURES OF PHYSICAL GROWTH ON CHILDREN FOUR TO EIGHT YEARS OF AGE. Child Devlpmt. 21: 141–147.

*———— and MEREDITH, E. M.

1953. THE BODY SIZE AND FORM OF PRESENT-DAY WHITE ELEMENTARY SCHOOL CHILDREN RESIDING IN WEST-CENTRAL OREGON. Child Devlpmt. 24: 83–102.

Measurements are for 941 children, boys 7 and 10 years and girls 9 and 11 years old, from Eugene, Oreg; 95 percent born west of the Mississippi River, 50 percent born and reared in Oregon, and more than 90 percent of northwest European lineage. Eleven measurements are reported as means for 5th, 10th, 30th, 70th, 90th, and 95th percentiles. Comparisons are made with data from other published reports. Children were nude when measured.

———— and SHERBINA, P. R.

1951. BODY FORM IN CHILDHOOD: RATIOS QUANTITATIVELY DESCRIBING THREE SLENDER-TO-STOCKY CONTINUA ON GIRLS FOUR TO EIGHT YEARS OF AGE. Child Devlpmt. 22: 275–283.

Slenderness and stockiness of body stem, and upper and lower limbs were measured for girls from Iowa City laboratory elementary school.

———— and STUART, H. C.

1947. USE OF BODY MEASUREMENTS IN THE SCHOOL HEALTH PROGRAM. PART III. SUPPLEMENTARY NOTE SUPPLYING MEASUREMENT AND RATING EQUIVALENTS FOR THICKNESS OF SKIN AND SUBCUTANEOUS TISSUE BELOW LEFT SCAPULA AND ABOVE LEFT ILIUM. Amer. Jour. Pub. Health 37: 1435–1438.

MICHELSON, N.

1946. A METHOD FOR ASSESSING THE DEVELOPMENT OF THE HAND SKELETON. Amer. Jour. Phys. Anthrop. (n. s.) 4: 235–242.

*MILLER, R. B.

1943. PART II. PHYSIQUE AND PHYSIOLOGICAL STUDIES. In Physique, Personality, and Scholarship, by R. N. Sanford, M. M. Adkins, R. B. Miller, and others. Soc. Res. in Child Devlpmt. Monog. v. 8, No. 1, pp. 25–121, illus.

Subjects were 21 boys and 27 girls, 5 to 14 years old, from Boston, Mass. All were normal, healthy, racially homogeneous, and of good economic status. Forty-three were measured periodically for 3 years. A series of 18 measurements were made (in the nude).

MILMAN, D. H., and BAKWIN, H.

1950. OSSIFICATION OF METACARPAL AND METATARSAL CENTERS AS A MEASURE OF MATURATION. Jour. Ped. 36: 617–620, illus.
Children were 1 to 5 years of age.

*MOSCHETTE, D. S.

n. p. (a) ORIGINAL DATA OF A STATE STUDY CARRIED OUT IN 1948–49 ON A STATEWIDE SAMPLE OF LOUISIANA CHILDREN.

Areas represented were sugar and truck farming, rice and general farming, and both hill and delta cotton farming.

* Moschette, D. S.

n. p. (b) ORIGINAL DATA FROM SUBPROJECT 2 OF SOUTHERN REGIONAL NUTRITIONAL STATUS PROJECT S-15, 1949-54.

Data are for children 8 through 11 years. Only a light garment was worn when children were weighed and measured. Various sections of Louisiana were represented in the sample.

——— Causey, K., Cheely, E., and others.

1952. NUTRITIONAL STATUS OF PREADOLESCENT BOYS AND GIRLS IN SELECTED AREAS OF LOUISIANA. La. Agr. Expt. Sta. Tech. Bul. 465, 34 pp., illus.

Data from the Louisiana phase of the Southern Regional Nutritional Status Project S-15 are presented. Data on heights and weights are given only as deviations from standards. Detailed data used in this compilation are reported as Moschette, n. p. (b), above.

*Moser, A. M.

1945. NUTRITIONAL CONDITION OF CHILDREN IN RELATION TO SCHOOL LUNCHES IN TWO SOUTH CAROLINA RURAL COMMUNITIES. S. C. Agr. Expt. Sta. Bul. 359, 54 pp,. illus.

Supplementary table 13 (pp. 49-50) presents data on heights and weights of three groups of South Carolina boys and girls. Children wore "simple clinical garments" when measurements were made. Weighted averages were used for values in the tables in this compilation.

Muhsam, H. V.

1947. CORRELATION IN GROWTH. Human Biol. 19: 260-269.

"Normal development" is measured only by seriatim measurements on same individuals. Growth in height and weight during different periods is compensatory and usually not parallel. The phenomenon of compensation and lack of parallelism cause difficulties in establishing norms. The discussion is based on data of Wilson (1935).

Mullen, F. A.

1940. FACTORS IN THE GROWTH OF GIRLS. Child Devlpmt. 11: 27-42, illus.

Height, arm span, length of forearm, length of right lower leg, sitting height, weight, bi-iliac diameter, bitrochanteric diameter, chest girth, chest width, chest depth, shoulder width, head length, head width, head height, lung capacity, and right hand squeeze were measured in 1927-37 on children from the University of Chicago Laboratory Schools.

*Newcomer, E. O., and Meredith, H. V.

1951. ELEVEN MEASURES OF BODY SIZE ON A 1950 SAMPLE OF 15-YEAR-OLD WHITE SCHOOL BOYS AT EUGENE, OREGON. Human Biol. 23: 24-40.

Boys were measured clad only in shorts. Extensive anthropometric data were recorded. Comparison was also made with data from 17 North American studies since 1930.

Nicolson, A. B., and Hanley, C.

1953. INDICES OF PHYSIOLOGICAL MATURITY: DERIVATION AND INTERRELATIONSHIPS. Child Devlpmt. 24: 3-38, illus.

The authors consider that a maturity score in standard score form which measures overall adolescent physiological maturation represents the best possible index for the standing of an individual in relation to others in regard to chronology of maturation.

O'Brien, R.

1930. AN ANNOTATED LIST OF LITERATURE REFERENCES ON GARMENT SIZES AND BODY MEASUREMENTS. U. S. Dept. Agr. Misc. Pub. 78, 48 pp.

Includes references to "Anthropometry: Its Scope, Methods, and Instruments" published between 1850 and 1930.

*——— Girschick, M. A., and Hunt, E. P.

1941. BODY MEASUREMENTS OF AMERICAN BOYS AND GIRLS FOR GARMENT AND PATTERN CONSTRUCTION. U. S. Dept. Agr. Misc. Pub. 366, 141 pp., illus. (In coop. with WPA.)

Body measurements of 147,088 boys and girls are reported. About 19 percent of the children were of foreign or mixed parentage, the rest of native parentage. Subjects 4 to 14 years old were from 16 States and District of Columbia. Children 15 to 17 were from Colorado, Illinois, Michigan, Ohio, and Utah. Details of measuring procedures are provided. Data used in this compilation are from tables 34, 35, 39, and 40.

*Odland, L. M.

n. p. ORIGINAL DATA FROM THE MONTANA PHASE OF THE WESTERN REGIONAL NUTRITIONAL STATUS PROJECT W-4, 1948-52. (Mont. Agr. Expt. Sta. in coop. with U. S. Dept. Agr.)

Children were from Bozeman and Great Falls. Only native born and reared children were included. College-aged students included in this compilation were also natives of Montana.

Overman, A.
1937. the possible relation of economic status to the physical condition of lincoln children as indicated by their heights and weights and gains in heights and weights. (Thesis, Univ. Nebr.)

This publication was not available for loan.

Palmer, C. E.
1932. the relationship of erect body length to supine body length. Human Biol. 4: 262–271, illus.

Measurements were made on 571 boys and 552 girls between the ages of 18 months and 20 years. The following formulas are proposed:

For boys: erect length $= -11.252 + 1.1490$ (supine length) $-.000508$ (supine length)^2.
For girls: erect length $= -8.999 + 1.1233$ (supine length) $-.000464$ (supine length)^2.

Tables are given for values from 80 cm. to 180 cm. supine length for both boys and girls.

*——— and Collins, S. D.
1935. variations in physique and growth of children in different geographic regions of the united states. physical measurement studies no. 2. U. S. Pub. Health Serv. Rpts. 50: 335–347, illus.

States in four areas were included: Northeast: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania. North Central: Minnesota, Wisconsin, Michigan, Indiana, Illinois. South: Texas, Louisiana, Arkansas, Tennessee, Kentucky, Missouri. West: Utah, Nevada. Seven measurements were made. Annual increments were also reported.

——— Kawakami, R., and Reed, L. J.
1937. anthropometric studies of individual growth. ii. age, weight, and rate of growth in weight, elementary school children. Child Devlpmt. 8: 47–61, illus.
Companion study to that of Palmer and Reed (1935).

——— and Reed, L. J.
1935. anthropometric studies of individual growth. i. age, height, and growth in height, elementary school children. Human Biol. 7: 319–334, illus.

Measurements are reported for Hagerstown, Md., children, from 1921 to 1928. Data are included in Wolff's 1941 and 1942 reports.

*Patton, M. B.
n. p. original data from the ohio phase of the north central regional nutritional status project nc–5, subproject 2, 1948–52. (Ohio Agr. Expt. Sta. in coop. with U. S. Dept. Agr. and U. S. Pub. Health Serv.)

Data were from children in 9 schools in central and southern Ohio and 6 schools in northern Ohio. Both urban and rural children were represented. Children were weighed in indoor clothing and weights calculated to nude values.

*Peatman, J. G., and Higgons, R. A.
1938. growth norms from birth to the age of 5 years. a study of children reared with optimal pediatric and home care. Amer. Jour. Dis. Children 55: 1233–1247, illus.

Children were of American parentage—north European stock. They were reared in suburban environment, from Rye, N. Y., Greenwich, Conn., and Westchester County, N. Y. Most of them came from middleclass homes. Parents had high school education; many were college graduates. Children were receiving regular pediatric care. Experimental data on heights and weights are recorded, and smoothed values are proposed as standards.

Pett, L. B.
1955. a canadian table of average weights for height, age and sex. Amer. Jour. Pub. Health 45: 862–868, illus.

Pryor, H. B.
1936. certain physical and physiologic aspects of adolescent development in girls. Jour. Ped. 8: 52–62.

This is a study of 192 pubescent and 230 nonpubescent California girls matched for age.

———
1940. width-weight tables for boys and girls from 1 to 17 years—for men and women from 18 to 41 + years. Stanford Univ. Press, 2nd Rev., 15 pp., illus.

——— and Stolz, H. R.
1933. determining appropriate weight for body build. Jour. Ped. 3: 608–622, illus.

Height, width, weight tables are presented, and data are compared with Baldwin-Wood data.

Pyle, S. I., Mann, A. W., Dreizen, S., and others.
1948. A SUBSTITUTE FOR SKELETAL AGE (TODD) FOR CLINICAL USE: THE RED GRAPH METHOD. Jour. Ped. 32: 125–136, illus.

> The authors revised the Todd standards to permit analyses of developmental symmetry of several bones of a functional unit of the skeleton as well as skeletal age from each X-ray of the child. A number of features of each joint surface appear stepwise to replace each other and therefore are skeletal maturity indicators.

—— and Menino, C.
1939. OBSERVATIONS ON ESTIMATING SKELETAL AGE FROM THE TODD AND THE FLORY BONE ATLASES. Child Devlpmt. 10: 27–34.

—— and Sontag, L. W.
1943. VARIABILITY IN ONSET OF OSSIFICATION IN EPIPHYSES AND SHORT BONES OF THE EXTREMITIES. Amer. Jour. Roentgenol. 49: 795–798.

> Tables of time of ossification are given—means, standard deviations, and coefficients of variability—for 61 centers from X-rays of 64 white boys and 69 white girls, many of them from birth to 9 years.

Redfield, J. E., and Meredith, H. V.
1938. CHANGES IN THE STATURE AND SITTING HEIGHT OF PRESCHOOL CHILDREN IN RELATION TO REST IN THE RECUMBENT POSITION AND ACTIVITY FOLLOWING REST. Child Devlpmt. 9: 293–302.

> Changes in stature and sitting height of 4-year-old children associated with an afternoon rest period are appreciable—equivalent to about 2 months' growth for children of their age.

Reynolds, E. L., and Schoen, G.
1947. GROWTH PATTERNS OF IDENTICAL TRIPLETS FROM 8 THROUGH 18 YEARS. Child Devlpmt. 18: 130–151, illus.

—— and Sontag, L. W.
1944. SEASONAL VARIATIONS IN WEIGHT, HEIGHT, AND APPEARANCE OF OSSIFICATION CENTERS. Jour. Ped. 24: 524–535, illus.

—— and Sontag, L. W.
1945. THE FELS COMPOSITE SHEET II: VARIATIONS IN GROWTH PATTERNS IN HEALTH AND DISEASE. Jour. Ped. 26: 336–352, illus.

—— and Wines, J. V.
1948. INDIVIDUAL DIFFERENCES IN PHYSICAL CHANGES ASSOCIATED WITH ADOLESCENCE IN GIRLS. Amer. Jour. Dis. Children 75: 329–350, illus.

—— and Wines, J. V.
1951. PHYSICAL CHANGES ASSOCIATED WITH ADOLESCENCE IN BOYS. Amer. Jour. Dis. Children 82: 529–547, illus.

*Richey, H. G.
1937. THE RELATION OF ACCELERATED, NORMAL AND RETARDED PUBERTY TO THE HEIGHT AND WEIGHT OF SCHOOL CHILDREN. Soc. Res. in Child Devlpmt. Monog. v. 2, No. 1, 67 pp., illus.

> Data are from the permanent records of the University of Chicago Laboratory Schools. Jewish children were omitted. Nude weights were used. Children were from well-to-do professional classes.

Roberts, D. F.
1953. BODY WEIGHT, RACE, AND CLIMATE. Amer. Jour. Phys. Anthrop. (n.s.) 11: 533–558, illus.

> Geographic distribution of mean body weight in indigenous populations suggests an inverse relationship with mean environmental temperature, which is highly significant both before and after the influence of stature and group affinity are taken into account. Lighter weight for given stature is found in long-established tropical populations.

Roberts, L. J.
1935. NUTRITION WORK WITH CHILDREN. Ed. 2, 639 pp., illus. University of Chicago Press.

> This edition gives in more detail than Martin's third edition (1954) the history of early American growth studies, from Bowditch to Baldwin (1872–1914).

Robinow, M.
1942. THE VARIABILITY OF WEIGHT AND HEIGHT INCREMENTS FROM BIRTH TO SIX YEARS. Child Devlpmt. 13: 159–164, illus.

*Sawtell, R. O.
1929. OSSIFICATION AND GROWTH OF CHILDREN FROM ONE TO EIGHT YEARS OF AGE. Amer. Jour. Dis. Children 37: 61–87.

> Children were from the Chelsea and Greenwich village sections of New York City. Parents were moderately prosperous. Children were weighed in the nude.

SCAMMON, R. E.

1927. THE LITERATURE ON THE GROWTH AND PHYSICAL DEVELOPMENT OF THE FETUS, INFANT, AND CHILD: A QUANTITATIVE SUMMARY. Anat. Rec. 35: 241–267, illus.

> The report covers findings from a bibliography of some 5,400 titles up to but not including 1926. It includes an annotated bibliography of bibliographical sources.

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1930. THE MEASUREMENT OF THE BODY IN CHILDHOOD. *In* The Measurement of Man, by J. A. Harris, C. M. Jackson, D. G. Paterson, and R. E. Scammon, pp. 171–215, illus. Univ. Minn. Press, St. Paul.

*SCHLUTZ, F. W., and KNOTT, E. M.

1938. THE EFFECT OE VARIED VITAMIN B INGESTION UPON THE APPETITE OF CHILDREN. Jour. Nutr. 15: 411–427, illus.

> Details of methods for measurement of the children are not given. Children were considered normal, although some were from the Home for Convalescent Crippled Children, in Chicago. No data are given on ancestry or race.

*SCHWARTZ, L., BRITTON, R. H., and THOMPSON, L. R.

1928. STUDIES IN PHYSICAL DEVELOPMENT AND POSTURE. II. BODILY GROWTH WITH AGE. U. S. Pub. Health Serv. Bul. 179, pp. 39–106, illus.

> Eight measurements are reported for boys and men from 3 to 49 years of age in New York City. All were of native parentage. Separate records were made for prepubescent, pubescent, and postpubescent boys 13, 14, and 15 years of age.

SHUTTLEWORTH, F. K.

1934. STANDARDS OF DEVELOPMENT IN TERMS OF INCREMENTS. Child Devlpmt. 5: 89–91.

> Standards in terms of increments emphasize progress rather than status, and depend more on environment over a short period than on heredity or constitutional and environmental factors over a period of years.

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1934. VAN DYKE'S DATA ON THE RELATION OF MENSTRUATION TO THE GROWTH OF GIRLS. School Rev. 42: 210–212.
> Criticism is made of the interpretations by Van Dyke (1930) of factors involved.

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1937. SEXUAL MATURATION AND THE PHYSICAL GROWTH OF GIRLS AGE SIX TO NINETEEN. Soc. Res. in Child Devlpmt. Monog. v. 2, No. 5, 253 pp., illus.

> This report deals primarily with procedures and statistical methods appropriate for analysis of longitudinal data, and with patterns of physical growth among contrasting groups of girls whose menarche occurred at different ages.

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1938a. THE ADOLESCENT PERIOD: A GRAPHIC AND PICTORIAL ATLAS. Soc. Res. in Child Devlpmt. Monog. v. 3, No. 3, 246 pp., illus.

> New separate graphic and pictorial atlases were published by the author in 1951 (a and b).

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1938b. SEXUAL MATURATION AND THE SKELETAL GROWTH OF GIRLS AGE SIX TO NINETEEN. Soc. Res. in Child Devlpmt. Monog. v. 3, No. 5, 56 pp., illus.

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1939. THE PHYSICAL AND MENTAL GROWTH OF GIRLS AND BOYS AGE SIX TO NINETEEN IN RELATION TO AGE AT MAXIMUM GROWTH. Soc. Res. in Child Devlpmt. Monog. v. 4, No. 3, 291 pp., illus.

> Children were from three towns near Boston. Measurements were made at school; the children were dressed in indoor clothing but without shoes. They were about 63 percent north European stock, 24 percent Italian, 4 percent southern European, 7 percent Jewish, and 1 percent Negro and mixed. Ages of maximum growth are highly reliable indicators of sexual maturity. Data from tables 38–43 were used in this compilation for tables and graphs 7a and 7b in section III, from tables 46 and 47 for tables in section I and graphs 11a and 11b in section III.

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1951a. THE ADOLESCENT PERIOD: A GRAPHIC ATLAS. Soc. Res. in Child Devlpmt. Monog. v. 14, No. 1, 453 figures, plus 7 pp. index, illus.

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1951b. THE ADOLESCENT PERIOD: A PICTORIAL ATLAS. Soc. Res. in Child Devlpmt. Monog. v. 14, No. 2, 69 pp., illus.

*SIMMONS, K.

1944. THE BRUSH FOUNDATION STUDY OF CHILD GROWTH AND DEVELOPMENT. II. PHYSICAL GROWTH AND DEVELOPMENT. Soc. Res. in Child Devlpmt. Monog. v. 9, No. 1, 87 pp., illus.

> The sample, from Greater Cleveland, was selected as free from gross physical and mental defects. The children had similar above average economic and educational status and similar national antecedents (north European). Details of measurement procedures are given. Shoes, coats, and sweaters were removed before measurements were made. Series I children were measured from age 3 months through 7 years, series II from age 6 through 12 years, and series III from age 11 through 16 years.

SIMMONS, K. and GREULICH, W. W.

1943. MENARCHEAL AGE AND THE HEIGHT, WEIGHT, AND SKELETAL AGE OF GIRLS AGED 7 TO 17 YEARS. Jour. Ped. 22: 518–548, illus.

> General height-weight data are included in the more extensive report of Simmons 1944. Data relating height and weight of three menarcheal groups to chronological age are given in graphs. Criticism is made of use of Wetzel's grid technique as an assessment of maturation level.

—— and TODD, T. W.

1938. GROWTH OF WELL CHILDREN: ANALYSIS OF STATURE AND WEIGHT, 3 MONTHS TO 13 YEARS. Growth 2: 93–134, illus.

> These data for Cleveland children are also included in the more extensive report of Simmons (1944).

SONTAG, L. W., and LIPFORD, J.

1943. THE EFFECT OF ILLNESS AND OTHER FACTORS ON THE APPEARANCE PATTERN OF SKELETAL EPIPHYSES. Jour. Ped. 23: 391–409, illus.

> Time of appearance of 38 selected ossification centers are noted from serial X-rays of left side of the body. Greater similarity of patterns was found among siblings than among nonsiblings. Centers were not easily influenced by acute illness.

—— and REYNOLDS, E. L.

1945. THE FELS COMPOSITE SHEET. I. A PRACTICAL METHOD FOR ANALYZING GROWTH PROGRESS. Jour. Ped. 26: 327–335, illus.

> Norms are based on measurements of about 250 children from Antioch, Ohio, of average or better economic status, primarily early American stock, distribution about equally urban and rural. Norms above 9½ years are from Richey (1937). Values are not included in tables in this compilation as numbers of boys and girls included in each mean were not given.

—— SNELL, D., and ANDERSON, M.

1939. RATE OF APPEARANCE OF OSSIFICATION CENTERS FROM BIRTH TO AGE OF FIVE YEARS. Amer. Jour. Dis. Children 58: 949–956, illus.

> A scale is presented which rates progressive skeletal development of boys and girls based on the study of longitudinal growth. All joints of the left upper and lower extremities are given equal rating with the hand in appraising skeletal growth.

SOUTHER, S. P., ELIOT, M. M., and JENSS, R. M.

1939. A COMPARISON OF INDICES USED IN JUDGING PHYSICAL FITNESS OF SCHOOL CHILDREN. Amer. Jour. Pub. Health 29: 434–438.

> This is a preliminary report of the New Haven, Conn., study by Jenss and Souther (1940).

STEGGERDA, M.

1944. CHARLES BENEDICT DAVENPORT (1866–1944); THE MAN AND HIS CONTRIBUTIONS TO PHYSICAL ANTHROPOLOGY. Amer. Jour. Phys. Anthrop. (n.s.) 2: 167–185, illus.

*—— and DENSEN, P.

1936. HEIGHT, WEIGHT AND AGE TABLES FOR HOMOGENEOUS GROUPS WITH PARTICULAR REFERENCE TO NAVAHO INDIANS AND DUTCH WHITES. Child Devlpmt. 7: 115–120, illus.

> Children were measured with "clothing at a minimum" and nude weights recorded. Only the data on Dutch children were used for this compilation.

STOLZ, H., and STOLZ, L. M.

1951. SOMATIC DEVELOPMENT OF ADOLESCENT BOYS. 557 pp., illus. MacMillan, N. Y.

> Basic data from the California Adolescent Study, 1932 to 1939, are presented as gains in height and weight and relation to puberty rather than actual heights and weights related to age. For this reason the data are not adaptable for use in this compilation, although they give valuable basic information.

STONE, C. P., and BARKER, R. G.

1937. ON THE RELATIONSHIP BETWEEN MENARCHEAL AGE AND CERTAIN MEASUREMENTS OF PHYSIQUE IN GIRLS OF AGES 9 TO 16 YEARS. Human Biol. 9: 1–28, illus.

> Average heights, weights, bi-iliac diameter, and chest width of girls menstruating more than 1 year and 1 year or less are presented.

*STORVICK, C. A.

n. p. ORIGINAL DATA FROM THE OREGON PHASE OF THE WESTERN REGIONAL NUTRITIONAL STATUS PROJECT W–4, 1948–52. (Oreg. State Col. in coop. with U. S. Dept. Agr. and U. S. Pub. Health Serv.)

> Children came from four counties, Clatsop and Coos on the coast and Deschutes and Klamath in central Oregon. Only native born and reared children were included.

Stuart, H. C.

1939. observation of growth of children in pediatric practice. Amer. Jour. Dis. Children 57: 1417–1421.

A general address with no original data.

1943. need for observation of growth in appraising adequacy of nutrition in childhood. Amer. Jour. Dis. Children 65: 320–325.

A general report.

1946. normal growth and development during adolescence. New England Jour. Med. 234: 666–672, 693–700, and 732–738, illus.

A general report. A good reference list is appended.

1947. physical growth during adolescence. Amer. Jour. Dis. Children 74: 495–502.
A general article.

——— and Dwinell, P. H.
1942. the growth of bone, muscle, and overlying tissues in children six to ten years of age as revealed by studies of roentgenograms of the leg area. Child Devlpmt. 13: 195–213, illus.

The technique is described for adaptation to the study of children 6 to 10 years of age, of methods reported for younger children in 1940 (see next reference). Examples are given.

——— Hill, P., and Shaw, C.
1940. studies from the center for research in child health and development, school of public health, harvard university. iii. the growth of bone, muscles and overlying tissues as revealed by studies of roentgenograms of the leg area. Soc. Res. in Child Devlpmt. Monog. v. 5, No. 3, 220 pp., illus.

Includes description of a method of evaluating these tissues, standards derived from a series of normal children examined periodically from birth to 7 years, and examples of the growth of individual children.

——— and Meredith, H. V.
1946. use of body measurements in the school health program. part i. general considerations and the selection of measurements. Amer. Jour. Pub. Health 36: 1365–1373.

The authors recommended measurement of standing height, body weight, hip width, chest circumference, and leg girth, and subjective ratings of the thickness of two selected folds of skin and subcutaneous tissue.

——— and Meredith, H. V.
1946. use of body measurements in a school health program. part ii. methods to be followed in taking and interpreting measurements and norms to be used. Amer. Jour. Pub. Health 36: 1373–1386, illus.

Methods for measurements of weight, height, hip width, chest circumference, and leg girth are described. Norms for half-year values for boys and for girls from 5 to 18 years are given for 10, 25, 50, 75, and 90 percentiles. The norms are derived from measurements of white children living in or near Iowa City, in attendance at the University of Iowa experimental elementary and high schools between 1930 and 1945. Parents were almost exclusively American-born, and grandparents predominantly American-born. Over 90 percent of the children were of northwest European ancestry. About 40 percent of the fathers were professional men; 35 percent, business proprietors, managers, or skilled trade employee; 15 percent, farmers; and 10 percent, clerks, carriers, or semiskilled laborers. The full-year values in the table represent actual measurements, usually within 2 weeks of the birthday. The half-year values represent measurements derived by interpolation.

——— and staff
1939. studies from the center for research in child health and development, school of public health, harvard university. i. the center, the group under observation, sources of information, and studies in progress. Soc. Res. in Child Devlpmt. Monog., v. 4, No. 1, 261 pp. illus.

The center and plan of the studies are described.

Sumner, E. E., and Whitacre, J.
1931. some factors affecting accuracy in the collection of data on the growth in weight of school children. Jour. Nutr. 4: 15–23.

It is important to use a known weight of clothing, and to weigh children at the same hour of the day each month with urinary bladder empty, if weight changes from month to month are being followed. The authors have indicated variations in weight of summer and winter clothing.

*Talbot, F. B., Wilson, E. B., and Worcester, J.
1937. basal metabolism of girls—physiologic background and application of standards. Amer. Jour. Dis. Children 53: Part II, pp. 275–347, illus.

> The children, pupils in a private school in Boston, were from well-to-do families with excellent hygienic background and opportunities, and represented a characteristic cross-section of the typical private school population in New England. Details of measurements were not supplied. Ages were given in years and months but were used as of last birthday for this compilation.

Tanner, J. M.
1948. a guide to american growth studies. Phys. Anthrop. Yearbook 3: 28–33.

———

1949. studies of child growth in the united states. Lancet [London] 256: 663–665.

> The author reports on child growth laboratories he had visited on a trip to the United States.

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1951. some notes on the reporting of growth data. Human Biol. 23: 93–159.

> A series of notes arising from the author's difficulties when faced with the extraction of information from a mass of measurements. Part 1 deals with the single measurement and reemphasizes the importance of reporting longitudinal data in a different way from cross sectional. The technique needed to get the maximum information out of the data from mixed longitudinal series and from a long series of measurements on a single individual are discussed. Part 2 deals with the simultaneous reporting of two or more measurements.

———

1952. the assessment of growth and development in children. Arch. Dis. Childhood 27: 10–33, illus.

> This is a critical documented review of methods and standards for assessment of the growth of children and their limitations.

———

1955. growth at adolescence. 212 pp., illus. C. H. Thomas, Springfield, Ill.

> This is an interesting review of the literature and unpublished studies describing growth and development of the adolescent from a biological point of view. An extensive bibliography is included.

*Taylor, C. M.
n. p. original data from studies of basal metabolism of children at teachers college, columbia university, n. y. (Teachers Col. Columbia Univ. in coop. with U. S. Dept. Agr.)

> Children were weighed and measured in indoor clothing, but without shoes. They were from New York City and vicinity.

*Thompson, E. M., Cox, E. W., and Ridgway, A. M.
1948. the basal metabolism of two hundred and eighteen girls and young women of southern arizona, fourteen to twenty-three years of age inclusive. Jour. Nutr. 36: 507–517, illus.

> The girls were generally born and reared in southern Arizona. Details of height-weight measurements are not given.

*Topper, A., and Mulier, H.
1932. basal metabolism of normal children. the puberty reaction. Amer. Jour. Dis. Children 43: 327–336, illus.

> Height, sitting height, and weight data on 150 cases in New York City were recorded when basal metabolism tests were run. No information on family background is given.

Trim, P. T., and Meredith, H. V.
1952. body form in homo sapiens: a study of five anthropometric ratios on white boys fifteen years of age. Growth 16: 1–14.

> Arm girth, chest girth, abdominal girth, leg girth, upper limb length, stem length, lower limb length, shoulder width, and hip width were measured for boys from Eugene, Oregon.

*Tucker, R.
n. p. original data from rhode island phase of northeastern regional nutritional status project ne–4, 1948–52. (See Babcock 1952.)

> Students came from Westerly and South Kingston consolidated high schools, representative of both rural and urban communities, and from Rhode Island State College. The families of the students represented both professional and laboring classes.

*Tuddenham, R. D., and Snyder, M. M.

1954. physical growth of california boys and girls from birth to eighteen years. Univ. Calif. Pub. in Child Devlpmt., v. 1, No. 2, pp. 183–364, illus.

Longitudinal data for 66 boys and 70 girls from Berkeley, Calif., measured from 1931 to 1947, are presented. Heights, weights, stem length, biacromial diameter, bi-iliac diameter, leg circumference, and dynamometric strength were measured. Individual values for all measurements are given in the appendix.

Tuxford, A. W.

1939. the estimation of physique and nutrition in children. Jour. Hyg. 39: 203–216, illus.

Formulas presented were based on measurements of London children in 1910. They were revised in 1942 on the basis of later data.

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1942. indices of physical development. Jour. Hyg. 42: 549–551.

The following formulas were based on data for London children in 1938:

For boys:
$$\frac{Wt. (kg.)}{Ht. (cm.)} \times \frac{335 - age (mo.)}{48} \quad \text{or} \quad \frac{Wt. (lb.)}{Ht. (in.)} \times \frac{336 - age (mo.)}{270} \quad \text{should equal 1.00}$$

For girls:
$$\frac{Wt. (kg.)}{Ht. (cm.)} \times \frac{308 - age (mo.)}{42} \quad \text{or} \quad \frac{Wt. (lb.)}{Ht. (in.)} \times \frac{308 - age (mo.)}{235} \quad \text{should equal 1.00}$$

*U. S. Public Health Service

n. p. original data from the cumberland study, 1947–48. (U. S. Pub. Health Serv. in coop. with U. S. Dept. Agr.)

Individual data for the fall 1947 measurements of children from the East Side and Columbia Street elementary schools in Cumberland, Md., were used in this compilation. Background and relative height-weight data are given by Velat and associates (1951).

Van Dyke, G. E.

1930. the effect of the advent of puberty on the growth in height and weight of girls. School Rev. 38: 211–221.

This is a report on relation of height to menarche of University of Chicago Laboratory School girls. See Shuttleworth (1934) for criticism of the fact that Van Dyke ignores age at which the heights were reached. Also, see Richey (1937) for evidence that early-maturing girls are taller than late-maturing girls at any given age up to about adult height. Richey's study was also made on University of Chicago Laboratory School girls.

Veeder, B. S., and Rolfing, K. H.

1927. studies in pubescent growth with special reference to periodic gains. Amer. Jour. Dis. Children 34: 211–217.

In this report only gains in height and weight are reported.

Velat, C., Mickelson, O., Hathaway, M. L., and others.

1951. evaluating school lunches and nutritional status of children. U. S. Dept. Agr. Circ. 859, 85 pp., illus. (In coop. with U. S. Pub. Health Serv.)

Deviations in weight for height from Baldwin-Wood Standards are reported for 676 Cumberland, Md., children. Average values for these children are given in the tables with references to U. S. Public Health Service, n. p., above.

*Vickers, V. S., and Stuart, H. C.

1943. anthropometry in the pediatrician's office: norms for selected body measurements based on studies of children of north european stock. Jour. Ped. 22: 155–170, illus.

Children were largely Irish. Measurements were made without clothing. The authors suggest need of the following measurements: Weight, standing or recumbent length, and chest and pelvic measurements.

*Wait, B., and Roberts, L. J.

1932. studies in the food requirement of adolescent girls: i. the energy intake of well nourished girls 10 to 16 years of age. Amer. Dietet. Assoc. Jour. 8: 209–237, illus.

Most of the subjects were from the children's home in Mooseheart, Ill. Height-weight data were incidental to the caloric study.

*Wallis, R. S.

1931 how children grow. an anthropometric study of private school children from two to eight years of age. Iowa Univ. Studies in Child Welfare v. 5, No. 1, 137 pp., illus.

Children were from City and Country School, Horace Mann School, and Institute of Child Development at Teachers College in New York City. They were mostly born in the United States of American parents.

*Warnick, K. O.

n. p. original data from the idaho phase of the western regional nutritional status project w–4, 1948–52. (Agr. Expt. Sta., Univ. Idaho, in coop. with U. S. Dept. Agr.)

Children came from Nampa and Boise in southwestern Idaho and the Coeur d'Alene area of northern Idaho.

Washburn, A. H.

1937. diverse attributes of healthy children. a report of progress in understanding the "normal child." Jour. Ped. 11: 37–63, illus.

The longitudinal study of average healthy children of Denver, conducted by the Child Research Council, is described. The types and character of data collected are illustrated by pictures and charts.

1950. growth significance in medicine viewed as human biology. Pediatrics 5: 765–770.

The author's Borden Award address. The study of the Denver Child Research Council is described. Multitude of phenomena in growth is emphasized; for example, individual variation in nutrition, changing structure and function in growth, the relation of temperament to body build. It is necessary to follow each child long enough to evaluate the significance for him of his particular characteristics and growth pattern.

*Webster, B., Harrington, H., and Wright, L. M.

1941. the standard metabolism of adolescence. Jour. Ped. 19: 347–364, illus.

Height and weight data were incidental to basal metabolism study.

Weech, A. A.

1954. signposts on the highway of growth. Amer. Jour. Dis. Children 88: 452–457.

Formulas for estimation of standards of growth are presented but no data usable in this compilation are given.

*Weisman, S. A.

1935. contour of the chest in children. iii. environment. Amer. Jour. Dis. Children 49: 52–59, illus.

Children from four schools in the "better" districts of Minneapolis and from four schools in the "poorer" districts were studied. They were stripped to the waist and shoes removed when measured. Height-weight data from the two groups were combined for the tables in this compilation.

Wetzel, N. C.

1941. physical fitness in terms of physique, development and basal metabolism, with a guide to individual progress from infancy to maturity: a new method for evaluation. Amer. Med. Assoc. Jour. 116: 1187–1195, illus.

Presentation of the grid method.

1943. assessing the physical condition of children.
      i. case demonstration of failing growth and the determination of "par" by the grid method. Jour. Ped. 22: 82–110, illus.
      ii. simple nutrition: a problem of failing growth and development. Jour. Ped. 22: 208–225, illus.
      iii. the components of physical status and physical progress and their evaluation. Jour. Ped. 22: 329–361, illus.

1944. growth. In Med. Physics, edited by O. Glasser, v. 1, pp. 513–569, illus.

The "motion of growth" and its application to growth and development in man are discussed in detail.

*Wheeler. L. R.

1933. a comparative study of the physical status of east tennessee mountain children. Human Biol. 5: 706–721.

Children ranging in age from 6 through 17 years were from families of low economic status. Their parents were engaged in agriculture and lumbering. The children were measured with shoes and coats removed.

*Whitacre, J.

1939. some body measurements of texas school children. Texas Agr. Expt. Sta. Bul. 567, 61 pp., illus.

Data are for white children 7 to 13 years old, Mexican children 8 to 15 years old, and Negro children 7 to 17 years old from San Antonio schools. Measurements were for nude weight, standing and sitting height, shoulder and hip width. Only the data for white children are included in this compilation.

*Wilcox, E. B.

n. p. (a). original data from the utah phase of the western regional nutritional status project w–4, 1948-52. (Utah State Agr. Col. and Agr. Expt. Sta. in coop. with U. S. Dept. Agr.)

The children came from the Ogden area.

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*Wilcox, E. B., Myers, G. G., and Miller, V.
n. p. (b) original data from a study of school children in cache and box elder counties, utah.

> The children were weighed and measured in 1954 and again in 1955. Shoes and outer garments were removed for the measurements.

*Wilson, C. A., Sweeny, M. E., Stutsman, R., and others.
1930. the merrill-palmer standards of physical and mental growth. 121 pp., illus. The Merrill-Palmer School, Detroit, Mich.

> Study was made of 256 nursery school children, 2 to 5 years old. Of the fathers, 40.7 percent were professional men, and of the mothers, 60.7 were professional women or had been before marriage. Over 50 percent of fathers and mothers had college training. All were white, all but one native born, and most were native-born parents. Standing height, recumbent length, stem length, and weight were measured within 3 days of birth date. Weight values for this compilation were taken from weight:height index multiplied by the height, as average weight values are not given in their table.

*Wilson, E. B.
1935. heights and weights of 275 public school girls for consecutive ages of 7 to 16 years, inclusive. Natl. Acad. Sci. Proc. 21: 633–634.

> These data are from Dearborn's data from the Harvard Growth Study. It is probably the first report of a longitudinal U. S. A. study covering such a large number of subjects over a 10-year period.

*Wise, F. C., and Meredith, H. V.
1942. the physical growth of alabama white girls attending wpa preschools. Child Devlpmt. 13: 165–174.

> These children were from "decidedly impoverished socioeconomic groups" from the area of Birmingham. They were undressed when measured.

Wolff, G.
1940. a study on the trend of weight in white school children from 1933 to 1936. material based on the examination of pupils of the elementary schools in hagerstown, maryland. Child Devlpmt. 11: 159–180, illus.

> Data are summarized in 1941 paper.

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1941. further results on the trend of weight in white school children. Child Devlpmt. 12: 183–205, illus.

> Values for weights of children from 6 through 21 years for 1933–36, 1937–40, 1933–40, and 1921–27 are given in tables.

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1942. a study of height in white school children from 1937 to 1940 and a comparison of different height-weight indices. Child Devlpmt. 13: 65–77, illus.

> Height data are given by years corresponding to weight data in 1941, but numbers of children are not included in the 1942 report. It was assumed that the numbers were the same as in the 1941 report.

Woodbury, R. M.
1921. statures and weights of children under six years of age. U.S. Children's Bur. Pub. 87, 117 pp., illus. (Community Child-Welfare Ser. No. 3.)

> This is a statistical study of the heights and nude weights of 172,000 white and colored children. Data in tables of standards are from tables 1 and 2 (pp. 85 and 86), smoothed figures for average statures and weights of white children.

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1923. tables for infancy and early childhood. Mother and Child, Suppl. to July issue, 3 pp.

Worcester, J., and Lombard, O. M.
1938. predictability of leg length. Child Devlpmt. 19: 159–166.

Yankauer, A.
1952. use and abuse of newer knowledge of growth and development in schools. Ped. 10: 627–633.

> A general article.

*Young, C. M.
n. p. original data from cornell phase of northeastern regional project ne–4, 1948–52. (See Babcock 1952.)

> The New York children were from four schools in the central and southern part of the State. Two schools represented urban communities of 13,000 to 29,000 population, one an industrial area of about 5,000, and the fourth a rural area of less than 1,000.